Akshay Rajhans

MathWorks
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🖺 https://arajhans.github.io

Professional Experience

Industry Employment

MathWorks, Natick, MA · 07/2013–

Head (10/2022–), Founding Member (06/2016–), Advanced Research and Technology Office
Chief (10/2022–), Principal (05/2018–), Senior (06/2016–04/2018) Research Scientist
Senior Software Engineer (07/2013–06/2016)

As a skip-level report of the CEO, I own the following key aspects of the applied research and innovation ecosystem:

- **Office Leadership and Management**: ● Helped build the advanced research and technology function from the ground up ● established and managing governance processes, best practices, budgets, dashboards, and executive reporting ● recruited and managing/ed research scientists and interns ● developed strong cross-functional partnerships with VPs and teams across engineering, marketing, sales, corporate development, legal, finance, and HR to ensure alignment and operational efficiency ● launched and/or streamlined the following worldwide programs:
  - **MathWorks Research Summits**: ● Organize annual technology conferences in North America and Asia with *100+* (*1000+ cumulative*) registered academic and industry R&D participants ● delivered *advanced product feedback* to engineering teams, inspired *new product features*, and catalyzed *new collaborations* ● established a key focus on *AI for Engineering* ● founded a *Deans' Roundtable* for executive engagement with key universities.
  - **Research Collaborations**: ● Grew and currently maintaining a portfolio of about *50* collaborative projects (*150+ cumulative*) in *dozens* of countries across *four* continents ● *accelerated the impact* of academic research while also supporting the research community ● partnerships have created new *product features* and led to *high-quality hires*.
  - **Challenge Project Hub**: ● Grew and currently maintaining a portfolio of *75+* project ideas on GitHub (with *hundreds* of signups and *90+* student submissions so far) ● launched new initiatives such as industry partner endorsements and special theme-based or university-based challenges ● promote student success via blogs and social media
  - **Intellectual Property**: ● Curate the patent portfolio ● own the processes and facilitate decision making ● liaise between inventors and in-house/outside counsel ● periodically report out to the executive leadership.
  - **Research Intelligence**: ● Leveraging research community literature and generative AI to advise product strategy
- **Thought Leadership** within and on behalf of MathWorks
  - Delivered *four keynotes* and *dozens* of technical publications, invited talks, panels, conferences, and industry advisory boards on behalf of MathWorks. *Invited expert* for government agencies (e.g., NSF, NIST).
  - Internally, serving as a *consultant to the executive leadership* (VPs and the CEO) on the above programs, and as an *advisor to the cross-functional Education business team*.
  - Executed/ing high-impact special projects for the CEO (MIT Climate and Sustainability Consortium) and VP of Engineering (advanced experimentation and accelerated adoption of Generative AI).
  - Hosted *50+* speakers for invited talks to disseminate knowledge to and inspire MathWorks employees and distributors.

Bosch, Pittsburgh, PA · 08/2009–12/2009

Research Intern

- Developed a model-based approach to non-intrusive load monitoring. *Co-inventor* on U.S. and international patents.

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)

- Broad responsibility as *one of only two* Electronic Controls AE Managers for industrial business across India
- Winner of *VP of Engineering's Recognition Award* for a test cell instrumentation modernization project

Academic Employment

Carnegie Mellon University, Pittsburgh, PA · 07/2008–05/2013

PhD Candidate in ECE (07/'08–05/'13); Teaching Assistant in ECE (08/'10–12/'10, 08/'11–12/'11)

- Led a *collaboration with Toyota* on an NSF-funded research project ● Authored 12 research publications; won a Best Paper Award and a Research Highlight in Communications of the ACM; presented work to NSF, Toyota, and at conferences.

University of Pennsylvania, Philadelphia, PA · 01/2006–06/2008

Research Staff (01/'08–06/'08); MS Candidate in EE (01/'06–12/'07); Teaching Assistant (08/'06–05/'08)

- Developed a research software toolbox that served as the *foundation for a subsequent PhD thesis* at RPI.

Education

Ph.D. **Electrical and Computer Engineering**, *Carnegie Mellon University*, Pittsburgh, PA   2008–2013.
Thesis Title: *Multi-Model Heterogeneous Verification of Cyber-Physical Systems*
Advisor: Bruce H. Krogh. **Thesis Committee:** Ken Butts (Toyota), David Garlan, André Platzer.
Coursework: • Numerical Methods for Engineering Design and Optimization • Formal Languages Automata, Computability and Complexity • Real Analysis • Linear Systems • Architectures for Software Systems • Hybrid Systems Analysis and Theorem Proving • Introduction to Model Checking

M.S. **Electrical Engineering**, *University of Pennsylvania*, Philadelphia, PA   2006–2007.
Thesis Title: *Development of a Robust Testing Toolbox for Hybrid Systems*
Advisor: George J. Pappas.
Coursework: • Advanced Robotics: Motion Planning and Control • Advanced Artificial Intelligence and Machine Learning • Advanced Topics in ESE: Systems Biology • Digital Signal Processing • Introduction to Optimization • Artificial Intelligence and Machine Learning • Engineering Entrepreneurship • Hybrid Systems • Control of Systems

B.E. **Electronics and Telecommunication**, *University of Pune*, Pune, India   1999-2003.

Thought Leadership

Invited Expert for Government Funding Agencies

○ **Funding Review Panelist** for Technology, Innovation, and Partnerships, National Science Foundation, 2023.
○ **User Advisory Committee Member**, Dutch Research Council (NWO), 2021–2024.
○ **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.

Advisory Boards and Committees

○ **Board of Directors**, ACM's Special Interest Group on Embedded Systems (SIGBED), 2025–
○ **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

○ **MathWorks Conferences**
  - *General Chair*: MathWorks Research Summit, 2023–
  - *Program Chair*: MathWorks Research Summit, Boston edition: 2017–2019, Tokyo edition: 2016–2019
○ **Research Conferences**
  - *Program Chair*: • International Conference on Assured Autonomy (ICAA) 2024 • Fourth International Workshop on Monitoring and Testing of CPS (MT-CPS) 2019 • Spring Simulation Conference (SpringSim) 2020 and 2019: CPS Track • Winter Simulation Conference (WinterSim/WSC) 2017: CPS Track
  - *Awards Chair*: Hybrid Systems: Computation and Control (HSCC) 2018
  - *Demo and Poster Chair*: Hybrid Systems: Computation and Control (HSCC) 2017
  - *Artifact Evaluation Chair*: Formal Modeling and Analysis of Timed Systems (FORMATS) 2022
  - *Associate Editor*: Technology Conferences Editorial Board, IEEE Control System Society, 2020–2022.
  - *PC Member*: • International Conference on Embedded Software (EMSOFT) 2025– • Design Automation Conference (DAC) 2025– • International Conference on Cyber-Physical Systems (ICCPS) 2020–, 2015 • Hybrid Systems: Computation and Control (HSCC) 2025–, 2016–19 • Annual Modeling and Simulation Conference (ANNSIM) 2021– • Multi-Paradigm Modeling for Cyber-Physical Systems (MPM4CPS) 2020– • International Workshop on Formal Co-Simulation of Cyber-Physical Systems (CoSim-CPS) 2017–2021 • International Symposium on Formal Methods (FM) 2021 • International Conference on Informatics in Control, Automation and Robotics (ICINCO) 2020, 2017– 18 • Winter Simulation Conference

WinterSim/WSC) 2017– • Numerical Software Verification Workshop (NSV) 2018–19 • Summer Simulation Multi-Conference (SummerSim) 2014–2020 • Spring Simulation Multi-Conference (SpringSim) 2015–2020 • Conference on Analysis and Design of Hybrid Systems (ADHS) 2015
- **_Repeatability Evaluation Committee Member_**: Hybrid Systems: Computation and Control 2014

Talks, Panels, and Tutorials

Keynote Talks

K4. "*From GUIs to Generative AI: Explainability in the tooling for engineered system design*", 4th International Workshop on Explainability of Real-time Systems and their Analysis (ERSA '25) at the IEEE Real-Time Systems Symposium (RTSS 2025) in Boston, MA, USA. December 2025.

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

PNL10. "*Explainability of Real-time Systems and their Analysis*", 4th International Workshop on Explainability of Real-time Systems and their Analysis (ERSA '25) at the IEEE Real-Time Systems Symposium (RTSS 2025) in Boston, MA, USA, December 2025.

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.

Tutorials

Tu2. "*Deploying Acoustic-Based Predictive AI for Machine Health using Model-Based Design Tools*", with Brenda Zhuang and Tianyi Zhu, Embedded Systems Week, Raleigh, NC, 2024.

Tu1. "*Low Code, High Performance Embedded AI with MATLAB and Arm IP Explorer*", with Brenda Zhuang and Eric Sondhi (Arm), Embedded Systems Week, Raleigh, NC, 2024.

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

Visioning Work

V8. Pramod Khargonekar, Tariq Samad, Saurabh Amin, Aranya Chakrabortty, 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

[with **external coauthor affiliations**] where indicated, * indicates research interns mentored

P28. Aurora Francesca Zanenga, Nunzio Marco Bisceglia, Benedetta Ippoliti, Andrea Bombarda, Angelo Gargantini, **Akshay Rajhans**, Claudio Menghi, "*Theano: A Tool for Verifying the Consistency and Completeness in Tabular Requirements*", 33rd ACM International Conference on the Foundations of Software Engineering (FSE) 2025. [with **University of Bergamo**]

P27. Claudio Menghi, Eugene Balai, Darren Valovcin, Christoph Sticksel, **Akshay Rajhans**, "*Completeness and Consistency of Tabular Requirements: an SMT-Based Verification Approach*", IEEE Transactions on Software Engineering, Volume: 51, Issue: 2, February 2025. [with **University of Bergamo**]

P26. 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. [with **George Washington University**]

P25. 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, February 2024. Also presented at the ACM International Conference on the Foundations of Software Engineering (FSE) 2024 in the Journal First track. [with **McMaster University**]

P24. 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. [with **University of Genova, Istituto Italiano di Tecnologia**]

P23. **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.

P22. 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.

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*", IEEE Control Systems Letters (L-CSS), Volume: 5, Issue: 6, Dec. 2021. Also presented at the American Control Conference (ACC) 2021. [with **University of Maryland**]

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*. [with **GE Research**]

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. [with **Rensselaer Polytechnic Institute**]

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^2) 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

Interns Mentored

- Abenezer Taye, Ph.D. Candidate at George Washington University. Intern at MathWorks. Summer 2021.
- Manuel Rodriguez, Ph.D. Candidate at University of Maryland College Park. Intern at MathWorks. Summer 2020.
- Xiangxue (Sherry) Zhao, Ph.D. Candidate at University of Maryland College Park. Intern at MathWorks. Summer 2020.
- Hae Jin (Hayley) Song, Ph.D. Candidate at University of Southern California. Intern at MathWorks. Summer 2020.
- Zhan Tu, Ph.D. Candidate at Purdue University. Intern at MathWorks. Summer 2019.
- Anastasios Dimas, Ph.D. Candidate at Rutgers University. Intern at MathWorks. Summer 2019.
- Mehmet N. Kurt, Ph.D. Candidate at Columbia University. Intern at MathWorks. Summer 2019.
- Amruta Namjoshi, M.Sc. Candidate, University of Pune. Project trainee at Cummins India. Spring 2004.

External Ph.D. 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.

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.

Professional Societies

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