

Sayan Mitra

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- CURRENT APPOINTMENTS
- ◇ **Associate Professor** (2014-present)
Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign.
 - ◇ **Affiliate Associate Professor** (2014-present)
Department of Computer Science
University of Illinois at Urbana-Champaign.
 - ◇ **Research Associate Professor** (2014-present)
Coordinated Science Laboratory
University of Illinois at Urbana-Champaign.
 - ◇ **Research Associate Professor** (2014-present)
Information Trust Institute
University of Illinois at Urbana-Champaign.
- PAST ACADEMIC APPOINTMENTS
- ◇ **Assistant Professor** (2008-2014)
Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign.
 - ◇ **Visiting Faculty** (July 2013)
Department of Computer Science, Oxford University, UK.
 - ◇ **Visiting Faculty Fellow** (May- July 2011)
Air-Force Research Laboratory
Kirtland Air-Force Base, Albuquerque, New Mexico.
 - ◇ **Postdoctoral Fellow.** (2007-2008)
Center for Mathematics of Information
California Institute of Technology.
- EDUCATION
- ◇ **Massachusetts Institute of Technology**, Cambridge, USA.
PhD in Computer Science, September 2007.
Thesis: *A verification framework for ordinary and probabilistic hybrid systems*
Advisor: Professor Nancy Lynch
 - ◇ **Indian Institute of Science**, Bangalore, India.
MSc in Computer Science and Automation, 2001.
 - ◇ **Jadavpur University**, Kolkata, India.
BE in Electrical Engineering, 1999.
- AWARDS AND FELLOWSHIPS
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- ◇ **RiSE fellowship from Austrian Society for Rigorous Systems Engineering**, 2015.
 - ◇ **Robert Bosch Sponsored Best Result Award** for the paper: "Progress on Powertrain Verification Challenge with C2E2" in ARCH Workshop of CPSWeek 2015.
 - ◇ **IEEE-Eta Kappa Nu's C. Holmes MacDonald Outstanding Electrical and Computer Engineering Teacher Award** (2013).

- ◇ **Samsung Global Research Outreach (GRO) award** for the project “A Debugger for Mobile-Cloud Applications” (2012).
- ◇ **Best Paper Award** at 32nd Intl. Conf. FORTE/FMOODS 2012. for the paper “A Small Model Theorem for Rectangular Hybrid Networks” with Taylor Johnson (2012).
- ◇ **Air-Force Office of Scientific Research (AFOSR) Young Investigator Research Award** for the project “Verification Engines for Hybrid Networks” (2012).
- ◇ **Air-Force Summer Faculty Fellowship Award** (2011).
- ◇ **National Science Foundation’s Faculty Early Career (CAREER) Development Award** for the project “Algorithms and Verification for Reliable Distributed Cyber-Physical Systems” (2011).
- ◇ **Center for Mathematics of Information Fellowship** awarded by California Institute of Technology (2007).
- ◇ **Barindra Memorial Medal, Subodh K. Basu Medal, Sandeep Tandon Memorial Prize** awarded by Jadavpur University (1999).

TEACHING

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- ◇ **Spring 2016, Fall 2012, Fall2014** ECE/CS584 Embedded System Verification
 - ◇ **Spring 2013-2015** ECE 220 Introduction to Computing
 - ◇ **Spring 2012** ECE428/CS425 Distributed Systems
 - ◇ **Fall 2011** ECE190 Introduction to Computing Systems
 - ◇ **Fall 2010** ECE190 Introduction to Computing Systems
 - ◇ **Spring 2010** ECE598 Modeling and Verification of Embedded Computing Systems
 - ◇ **Fall 2009** ECE190 Introduction to Computing Systems
 - ◇ **Spring 2009** ECE428/CS425 Distributed Systems
 - ◇ **Fall 2008** ECE598 Modelling and Verification of Real-time and Hybrid Systems
 - ◇ **Spring 2008** Lecture series on *Deductive Verification*, part of *CS141: Distributed Systems Laboratory (CalTech)*.

SOFTWARE

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1. **DryVR: Combining models and data for robust verification of autonomous and cyberphysical systems.**
Primary contributors: Bolun Qi, Chuchu Fan, Sayan Mitra, and Mahesh Viswanathan. First version released in 2017. Available from: <https://github.com/qibolun/DryVR>
 2. **C2E2: A complete verification tool for stateflow/nonlinear hybrid automata.**
Primary contributors: Parasara Sridhar Duggirala, Chuchu Fan, Matthew Potok, Bolun Qi, Sayan Mitra, Mahesh Viswanathan, . First version released in 2014. Available from: <http://publish.illinois.edu/c2e2-tool/>
 3. **StarL: A Programming Platform for Distributed Robotics.**
Primary contributors: Yixiao Lin, Ritwika Ghosh, Adam Zimmerman, and Sayan Mitra. First version released in 2014. Available from: <https://github.com/lin187/StarL1.5/>
 4. **Passel: A verification tool for parameterized networks of hybrid automata.**
Taylor Johnson and Sayan Mitra. First version released in 2014. Available from: <https://publish.illinois.edu/passel-tool/>
 5. **HARE: Hybrid Abstraction Refinement Engine.**
Parasara Sridhar Duggirala, Sayan Mitra, Mahesh Viswanathan. Released in 2013. Available from: <http://publish.illinois.edu/hare-tool/>

PUBLICATIONS

The (*) indicates that the author was a graduate student supervised by Sayan Mitra at the time of the publication of the article.

- WORKING PAPERS
1. **Passive safety of autonomously maneuvering spacecraft: hybrid models and verification approaches.** Nicole Chan* and Sayan Mitra. *Under review*, March 2017.
 2. **Koord: Language and analysis for robust, distributed, cyber-physical systems.** Ritwika Ghosh*, Sasa Misailovic, and Sayan Mitra. *Submitted for review*, April 2017.
- JOURNAL ARTICLES
1. **Entropy and minimal bit rates for state estimation and model detection.** Daniel Liberzon and Sayan Mitra. *In IEEE Transactions on Automatic Control (TAC)*, 2018.
 2. **Data-driven formal reasoning and their applications in safety analysis of vehicle autonomy features.** Chuchu Fan*, Bolun Qi*, and Sayan Mitra. *IEEE Design & Test*, January, 2018.
 3. **Differential privacy and entropy in distributed feedback systems: Minimizing mechanisms and performance trade-offs.** Zhenqi Huang*, Yu Wang, Sayan Mitra, and Geir Dullerud. *In IEEE Transactions on Control of Network Systems*, 4(1): 118-130, 2017.
 4. **Bounded invariant verification for time-delayed nonlinear networked dynamical systems.** Zhenqi Huang*, Chuchu Fan*, and Sayan Mitra. *In IFAC Journal on Nonlinear Analysis: Hybrid Systems (NAHS)*, Vol. 23, pages 211–229, February 2017, Elsevier.
 5. **Simulation-based verification of cardiac pacemakers with guaranteed coverage.** Zhenqi Huang*, Chuchu Fan*, Alexandru Mereacre, Sayan Mitra and Marta Z. Kwiatkowska. *IEEE Design & Test*, volume 32(5), pages 27–34, 2015.
 6. **Safe and stabilizing distributed multi-path cellular flows.** Taylor T. Johnson* and Sayan Mitra. *Theoretical Computer Science (TCS)*, volume 579, pages 9–32, May 2015. Elsevier.
 7. **Hybrid automata-based CEGAR for rectangular hybrid systems.** Pavithra Prabhakar, Parasara Sridhar Duggirala*, Sayan Mitra, and Mahesh Viswanathan. *Formal Methods in Systems Design (FMSD)*, volume 42(2), pages 105–134, April 2015, Springer.
 8. **Verifying cyber-physical interactions in safety-critical systems.** Sayan Mitra, Tichakorn Wongpiromsarn, and Richard Murray. *Special Issue of IEEE Security & Privacy on Safety-Critical Systems*, June 2013.
 9. **Safe flocking in spite of actuator faults using directional failure detectors.** Taylor T. Johnson* and Sayan Mitra. *In the Journal of Nonlinear Systems and Applications (JNSA)*, Volume 2, Number 1–2, 2011, Watam Press.
 10. **Verification of periodically controlled hybrid systems: Application to an autonomous vehicle.** Tichakorn Wongpiromsarn, Sayan Mitra, Richard Murray, and Andy Lamperski. *In Special Issue of ACM Transactions on Embedded Computing Systems*, 11(S2): 53, 2012.
 11. **Verification of distributed systems with local-global predicates.** K. Mani Chandy, Brian Go, Sayan Mitra, Concetta Pilotto, and Jerome White. *In the Journal of Formal Aspects of Computing*, 23(5), pages 1–31, Springer–London, September, 2010.
 12. **Self-stabilizing robot formations over unreliable networks.** Seth Gilbert, Nancy Lynch, Sayan Mitra, and Tina Nolte. *In Special Issue on Self-Adaptive and Self-Organising Wireless Networking Systems of ACM Transactions on Autonomous and Adaptive Systems (TAAS)*, 4(3), July 2009.
 13. **Verifying average dwell time of hybrid systems.** Sayan Mitra, Daniel Liberzon and Nancy Lynch. *ACM Transaction in Embedded Computing Systems (TECS)*, 8(1),1–37, December 2008.

14. **Specifying and proving properties of timed I/O automata in the TIOA toolkit.**
Myla Archer, Hongping Lim, Nancy Lynch, Sayan Mitra, and Shinya Umeno. In *Special issue of the Journal on Design Automation for Embedded Systems*, volume 2, numbers 1–2, June 2008, Springer 2008.
15. **Proving approximate implementations for probabilistic I/O automata.**
Sayan Mitra and Nancy Lynch. *Electronic Notes in Theoretical Computer Science*, 174(8):71–93, June 2007.
16. **PVS strategies for proving abstraction properties of automata.**
Sayan Mitra and Myla Archer. *Electronic Notes in Theoretical Computer Science*, 125(2):45–65, 2005.
17. **Specification language design for hybrid systems.**
Sayan Mitra and L. M. Patnaik. *Computational Mathematics, Modeling and Algorithms*, edited by J. C. Misra. Alpha Science Int’l, January 2003.

PEER-REVIEWED
CONFERENCE
PUBLICATIONS

1. **Controller Synthesis Made Real: Reach-avoid Specifications and Linear Dynamics.**
Chuchu Fan, Umang Mathur, Sayan Mitra and Mahesh Viswanathan. To appear in *Computer Aided Verification (CAV 2018)*, Oxford.
2. **Approximate Partial Order Reduction.**
Chuchu Fan, Zhenqi Huang, and Sayan Mitra. To appear in *Formal Methods (FM 2018)*, Oxford.
3. **State Estimation of Dynamical Systems with Unknown Inputs: Entropy and Bit Rates.**
Hussein Sibai* and Sayan Mitra. In *Hybrid Systems: Computation and Control (HSCC 2018)*, pages 217–226, April 2018, Porto, Portugal.
4. **DryVR: Data-driven verification and compositional reasoning for automotive systems.**
Chuchu Fan, Bolun Qi, Sayan Mitra, and Mahesh Viswanathan. To appear in *Computer Aided Verification (CAV)*, Heidelberg, 2017.
5. **Optimal data rate for state estimation of switched nonlinear systems.**
Hussein Sibaie and Sayan Mitra. In the Proceedings of the 20th ACM *Hybrid Systems: Computation and Control*, Pages 71–80, Pittsburgh, PA, April 2017. **Nominated for best paper award.**
6. **Locally optimal reach set over-approximation for nonlinear systems.**
Chuchu Fan*, James Kapinski, Xiaoqing Jin, and Sayan Mitra. In the Proceedings of *ACM SIGBED Conference on Embedded Software (EMSOFT) 2016*, Pittsburgh, PA. **Nominated for best paper award.**
7. **Automatic reachability analysis for nonlinear hybrid models with C2E2.**
Chuchu Fan*, Bolun Qi*, Sayan Mitra, Mahesh Viswanathan, and Parasara Sridhar Duggirala*. In the Proceedings of *28th International Conference on Computer Aided Verification (CAV)*, LNCS 9779, Pages 531–538, Toronto, Springer 2016.
8. **Entropy and minimal data rates for state estimation and model detection.**
Daniel Liberzon and Sayan Mitra. In *Hybrid System: Computation and Control (HSCC 2016)*, Pages 247–256, Vienna, Austria.
9. **Entropy notions for state estimation and model detection with finite-data-rate measurements.**
Daniel Liberzon and Sayan Mitra. In the Proceedings of *55th IEEE Conference on Decision and Control (CDC)*, pages 7335–7340, December 2016, Las Vegas, NV.
10. **Differential privacy in control and network systems.**
J. Cortés, G. E. Dullerud, S. Han, J. Le Ny, S. Mitra, and G. J. Pappas. In the Proceedings of *55th IEEE Conference on Decision and Control (CDC)*, pages 4252–4272, December 2016, Las Vegas, NV.
11. **Controller synthesis for linear time-varying systems with adversaries.**
Zhenqi Huang*, Yu Wang, Sayan Mitra, and Geir Dullerud. In the Proceedings of the *55th IEEE Conference on Decision and Control (CDC 2016)*, Osaka, Japan, 2015.

12. **Bounded verification with on-the-fly discrepancy computation.**
Chuchu Fan* and Sayan Mitra. In the proceedings of *13th International Symposium on Automated Technology for Verification and Analysis (ATVA 2015)*, Shanghai, China.
13. **Model checking tap withdrawal in *C. elegans*.**
Md. Ariful Islam, Richard DeFrancisco, Chuchu Fan*, Radu Grosu, Sayan Mitra and Scott Smolka. In the proceedings of the *Fourth International Workshop on Hybrid Systems and Biology*, Madrid, Spain 2015.
14. **Meeting a powertrain verification challenge.**
Parasara Sridhar Duggirala* and Chuchu Fan* and Sayan Mitra and Mahesh Viswanathan. In the proceedings of *Computer Aided Verification - 27th International Conference (CAV 2015)*, LNCS 9206, pages 536—543. San Francisco, July 18-24, 2015.
15. **StarL: Towards a unified framework for programming, simulating and verifying distributed robotic systems.** Yixiao Lin* and Sayan Mitra. In the Proceedings of the *16th ACM SIG-PLAN/SIGBED Conference on Languages, Compilers and Tools for Embedded Systems, (LCTES 2015)*, Pages 1–10. Portland, OR, USA, June.
16. **C2E2: A verification tool for annotated stateflow models.**
Parasara Sridhar Duggirala*, Sayan Mitra, Mahesh Viswanathan, and Matthew Potok. In the Proceedings of the *21st International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, April 2015.
17. **A Strategy for automatic verification of stabilization of distributed algorithms.**
Ritwika Ghosh* and Sayan Mitra. In the *Proceedings of 35th IFIP WG 6.1 International Conference on Formal Techniques for Distributed Objects, Components, and Systems (FORTE 2015)*, Grenoble, France, June 2-4. LNCS 9039, pages 35-49, Springer 2015. **Nominated for best paper award.**
18. **Differentially private distributed optimization.**
Zhenqi Huang*, Sayan Mitra, and Nitin Vaidya. In the proceedings of the *International Conference on Distributed Computing and Networks (ICDCN)*, January 2015. (Acceptance: 21%)
19. **Entropy-minimizing mechanism for differential privacy of discrete-time linear feedback systems.** Yu Wang, Zhenqi Huang*, Sayan Mitra, and Geir Dullerud. In the proceedings of the *Conference on Decision and Control (CDC)*, December 2014.
20. **Invariant verification of nonlinear hybrid automata networks of cardiac cells.**
Zhenqi Huang*, Chuchu Fan*, Alexandru Mereacre, Sayan Mitra, and Marta Kwiatkowska. In the proceedings of the *Computer-Aided Verification (CAV 2014)*, July 2014, Held as Part of the Vienna Summer of Logic, VSL 2014. Springer.
21. **Synthesis and verification of motor-transmission shift controller for electric vehicles.**
Hongxu Chen and Sayan Mitra. In the proceedings of the *International Conference on Cyber-physical Systems (ICCPS 2014)*, April 2014.
22. **Anonymized reachability of hybrid automata networks.**
Taylor T. Johnson* and Sayan Mitra. In the proceedings of *12th International Conference on Formal Modelling and Analysis of Timed Systems (FORMATS 2014)*. LNCS 8711, pages 130–145, Springer.
23. **Temporal precedence checking for switched models and its application to a parallel landing protocol.** Parasara Sridhar Duggirala*, Le Wang*, Sayan Mitra, Mahesh Viswanathan, César Muñoz. In the proceedings of *19th International Symposium on Formal Methods (FM 2014)*, LNCS 8442, pages 215-229, Springer.
24. **Proofs from simulations and modular annotations.**
Zhenqi Huang* and Sayan Mitra. In the proceedings of the *Seventeenth International Conference on Hybrid Systems: Computation and Control (HSCC 2014)*. Martin Fränzle, John Lygeros editors, Pages 183-192, ACM press, April 2014. **Nominated for DENSO Best Student Paper Award.**

25. **On the cost of differential privacy in distributed control systems.**
Zhenqi Huang*, Yu Wang, Sayan Mitra, and Geir Dullerud. In the proceedings of the *Third International Conference on High Confidence Networked Systems (HiCoNS 2014)*. Pages 105-114, ACM press.
26. **Verification of annotated models from executions.**
Parasara Sridhar Duggirala*, Sayan Mitra, and Mahesh Viswanathan. In the Proceedings of the *International Conference on Embedded Software (EMSOFT 2013)*, Montreal, Canada, April 2013.
27. **Hybrid automaton-based CEGAR for rectangular hybrid systems.**
Pavithra Prabhakar, Parasara S. Duggirala*, Sayan Mitra, and Mahesh Viswanathan. In the Proceedings of International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI), Rome, Italy 2013. (Acceptance: 30%)
28. **Invariant synthesis for verification of parameterized cyber-physical systems with application to aerospace systems** Taylor T. Johnson* and Sayan Mitra. In Proceedings of AIAA Infotech, 2013. Boston, MA.
29. **Static and dynamic analysis of timed distributed traces.** Parasara Sridhar Duggirala*, Taylor Johnson*, Adam Zimmerman*, and Sayan Mitra. In the Proceedings of *The 33rd IEEE Real-Time Systems Symposium (RTSS)*, 2012, IEEE press. (Acceptance: 23%)
30. **Verifying satellite rendezvous and conjunction avoidance: A formal approach to autonomy in space.**
Taylor Johnson*, Jeremy Green*, Sayan Mitra, Rachel Dudley, and R. Scott Erwin. In the proceedings of *International Conference on Formal Methods (FM) 2012*, Paris, France. (Acceptance: 22%)
31. **A small model theorem for rectangular hybrid automata networks.**
Taylor Johnson* and Sayan Mitra. In the Proceedings of *32nd IFIP International Conference on Formal Techniques for Distributed Systems: Formal Techniques for Networked and Distributed Systems (FORTE)*, Stockholm, Sweden, June 2012. LNCS Vol 7273, pages 18-34, Springer. (**Best Paper Award** selected out of 151 submissions in 3 conferences which were part of *7th International Federated Conference on Distributed Computing Techniques (DisCoTec 2012)*).
32. **Parameterized verification of distributed cyber-physical systems: An aircraft landing protocol case study.**
Taylor Johnson* and Sayan Mitra. In the Proceedings of *International Conference on Cyber-Physical Systems (ICCPS 2012)*, pages 161 - 170, Beijing, PRC. April 2012. IEEE press. (Acceptance: 34%)
33. **Lyapunov abstractions for verifying inevitability of hybrid systems.**
Parasara S. Duggirala* and Sayan Mitra. In the Proceedings of *15th International Conference on Hybrid Systems: Computation and Control (HSCC 2012)*, pages 115-124, Beijing, PRC. April 2012. ACM press.
34. **Computing bounded reach sets from sampled simulation traces.**
Zhenqi Huang* and Sayan Mitra. (Tool paper) In the Proceedings of *15th International Conference on Hybrid Systems: Computation and Control (HSCC 2012)*, Beijing, PRC. April 2012.
35. **Stability of linear systems with quantized and sampled interconnections.**
Taylor Johnson*, Sayan Mitra, and Cédric Langbort. In the Proceedings of *50th IEEE Conference on Decision and Control (CDC 2011)*, Orlando, FL, USA.
36. **Abstraction refinement for stability.**
Parasara S. Duggirala* and Sayan Mitra. In the Proceedings of *ACM/IEEE 2nd International Conference on Cyber-physical systems (ICCPS 2011)*, Chicago, IL, April 2011. (Acceptance: 26%)
37. **Sandboxing controllers for cyber-physical systems.**
Stanley Bak, Karthik Manamcheri*, Sayan Mitra, and Marco Caccamo. In the Proceedings of *ACM/IEEE 2nd International Conference on Cyber-physical systems (ICCPS 2011)*, Chicago, IL, April 2011. (Acceptance: 26%)

38. **A step towards verification and synthesis from Simulink/Stateflow models.**
Karthik Manamcheri*, Sayan Mitra, Stanley Bak, and Marco Caccamo. In the Proceedings (as tool paper) of *14th International Conference on Hybrid Systems: Computation and Control (HSCC 2011)*, Chicago, IL, April 2011.
39. **Computing bounded epsilon-reach set with finite precision computations for a class of linear hybrid automata.**
Kyoung-Dae Kim, Sayan Mitra, and P. R. Kumar. In the Proceedings of *14th International Conference on Hybrid Systems: Computation and Control (HSCC 2011)*, Chicago, IL, April 2011.
40. **Safe flocking in spite of actuator faults.**
Taylor Johnson* and Sayan Mitra. In the Proceedings of 12th International Symposium on Stabilization, Safety, and Security of Distributed Systems. LNCS 6366, pages 588-602. New York. September 2010.
41. **On the theory of Stochastic Processors.**
Parasara Sridhar Duggirala*, Sayan Mitra, Rakesh Kumar and Dean Glazeski. In Proceedings of *7th International Conference on Quantitative Evaluation of SysTems (QEST) 2010*. LNCS, Williamsburg, VA, September 2010.
42. **Safe and stabilizing distributed cellular flows.**
Taylor Johnson*, Sayan Mitra, and M. Karthikeyan. In Proceedings of *IEEE International Conference on Distributed Computing Systems (ICDCS 2010)*. Pages 577 - 586, Genova, Italy. IEEE press. (Acceptance: 15%)
43. **Bounded ϵ -Reachability of linear hybrid automata with a deterministic and transversal discrete transition condition.**
Kyoung-Dae Kim, Sayan Mitra, and P. R. Kumar. In Proceedings of the 49th *IEEE Conference on Decision and Control (CDC 2010)*, Atlanta, GA.
44. **Hybrid cyberphysical system verification with simplex using discrete abstractions.**
Stanley Bak, Ashley Greer, and Sayan Mitra. In the Proceedings of *IEEE 16th Real-Time and Embedded Technology and Applications Symposium (RTAS 2010)*. **Nominated for best paper award.** (Acceptance: 22%)
45. **Stability of distributed algorithms in the face of incessant faults.**
R. Lee DeVille and Sayan Mitra. In the Proceedings of *11th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS'09)*, LNCS 5873, pages 224-237. Lyon, France. November 2009.
46. **On convergence of concurrent systems under regular interactions.**
Pavithra Prabhakar, Sayan Mitra, and Mahesh Viswanathan. In the Proceedings of *20th International Conference on Concurrency Theory (CONCUR 2009)*. LNCS 5710, pages 527-541. Bologna, Italy, September, 2009. (Acceptance: 28%)
47. **Periodically controlled hybrid systems: Verifying A controller for an autonomous vehicle.**
Tichakorn Wongpiromsarn, Sayan Mitra, Richard Murray and Andrew Lamperski. In the Proceedings of *12th International Conference on Hybrid Systems: Computation and Control (HSCC 2009)*, San Francisco, CA. LNCS 5469, pages 396-410, March 2009.
48. **Self-stabilizing mobile robot formations with virtual nodes.**
Seth Gilbert, Nancy Lynch, Sayan Mitra, Tina Nolte. In the Proceedings of *10th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS'08)*, Detroit, MI. LNCS 5340, pages 188-202. November 2008.
49. **Convergence verification: From shared memory to partially synchronous systems.**
K. Mani Chandy, Sayan Mitra, and Concetta Pilotto. In Proceedings of *6th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS'08)*, Saint Malo, France. LNCS 5215, pages 218-232, September 2008.
50. **A Formalized theory for Stability and Convergence of Automata in PVS.**
Sayan Mitra and K. Mani Chandy. In Proceedings of *21st International Conference on Theorem*

Proving in High Order Logics (TPHOLs'08), Montreal, Canada. LNCS 5170, pages 230 – 245. August 2008.

51. **Trace-based semantics for probabilistic timed I/O automata.**
Sayan Mitra and Nancy Lynch. Extended abstract in *Hybrid Systems: Computation and Control (HSCC'07)*, volume 4416 of LNCS, Springer 2007, April 2007.
52. **Learning Cycle-linear hybrid automata of excitable cell models.**
Radu Grosu, Sayan Mitra, Pei Ye, Scott Smolka, Emilia Entcheva, and I.V. Ramakrishnan. In *Proceedings of Hybrid Systems: Computation and Control (HSCC'07)*, April 2007.
53. **Specifying and proving properties of Timed I/O Automata in the TIOA Toolkit.**
Myla Archer, Hongping Lim, Nancy Lynch, Sayan Mitra, and Shinya Umeno. In *Proceedings of Fourth ACM-IEEE International Conference on Formal Methods and Models for Codesign (MEMOCODE'06)*. Napa, CA 2006. (Selected for special issue of *Journal on Design Automation of for Embedded Systems*.)
54. **Verifying Average Dwell time by solving optimization problems.**
Sayan Mitra, Daniel Liberzon, and Nancy Lynch. In Ashish Tiwari and João P. Hespanha, editors, *Hybrid Systems: Computation and Control (HSCC'06)*, volume 3927 of LNCS, Santa Barbara, CA, March 2006.
55. **Translating Timed I/O Automata specifications for Theorem Proving in PVS.**
Hongping Lim, Dilsun Kaynar, Nancy Lynch, and Sayan Mitra. In *Proceedings of Formal Modeling and Analysis of Timed Systems (FORMATS'05)*, volume 3829 of LNCS, Uppsala, Sweden, September 2005.
56. **Proving Atomicity: an assertional approach.**
Gregory Chockler, Nancy Lynch, Sayan Mitra, and Joshua Tauber. In Pierre Fraigniaud, editor, *Proceedings of 19th International Symposium on Distributed Computing (DISC'05)*, volume 3724 of LNCS, pages 152 – 168, Cracow, Poland, September 2005. (Acceptance: 20%)
57. **Path Vector Face Routing: Geographic Routing with Local Face Information.**
Ben Leong, Sayan Mitra and Barbara Liskov. In *Proceedings of 13th IEEE International Conference on Network Protocols (ICNP'05)*, Boston, Massachusetts, November 2005. (Acceptance: 17%)
58. **Motion Coordination using Virtual Nodes.**
Nancy Lynch, Sayan Mitra, and Tina Nolte. In *Proceedings of 44th IEEE Conference on Decision and Control (CDC'05)*, Seville, Spain, December 2005. Full version available as *Technical Report MIT-LCS-TR-986*.
59. **Stability of Hybrid Automata with Average Dwell Time: an Invariant Approach.**
Sayan Mitra and Daniel Liberzon. In *Proceedings of the 43rd IEEE Conference on Decision and Control*, Paradise Island, Bahamas, December 2004.
60. **Safety Verification of model Helicopter Controller using Hybrid Input/Output Automata.**
Sayan Mitra, Yong Wang, Nancy Lynch, and Eric Feron. In *Hybrid System: Computation and Control (HSCC'03)*, volume 2623 of LNCS, Prague, Czech Republic, 2003. Full version available as *Technical report MIT-LCS-TR-880*.

PEER-REVIEWED
WORKSHOP
PUBLICATIONS &
TUTORIALS

1. **Verifying safety of an autonomous spacecraft rendezvous mission** Nicole Chan and Sayan Mitra. In *Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2017)* at CPSWeek 2017.
2. **Tutorial: Software tools for hybrid systems verification, transformation, and synthesis: C2E2, HyST, and TuLiP.**
P. S. Duggirala, C. Fan, M. Potok, B. Qi, S. Mitra, M. Viswanathan, S. Bogomolov, T. Johnson, L. V. Nguyen. In *Proceedings of IEEE Conference on Control Applications (CCA)*, pages 1024-1029, 2016.

3. **Controller synthesis for linear time-varying systems with adversaries.**
Zhenqi Huang, Yu Wang, Sayan Mitra and Geir Dullerud. In *Hot Topics in Science of Security (HOTSOS)*, Science of Security Meeting, CMU, April 2016.
4. **Progress on powertrain verification challenge with C2E2.**
Chuchu Fan, Parasara Sridhar Duggirala, Sayan Mitra, and Mahesh Viswanathan. In *Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2015)* held as part of CPSWeek 2015. **Robert Bosch Sponsored Best Results Award.**
5. **Proving abstractions of dynamical systems through numerical simulations.**
Sayan Mitra. In *Hot Topics in Science of Security (HOTSOS)*, Science of Security Meeting, Raleigh, April 2014.
6. **Differentially private iterative synchronous consensus.**
Zhenqi Huang, Sayan Mitra and Geir Dullerud. In *Proceedings of the Workshop on Differentially Private Iterative Synchronous Consensus in conjunction with the ACM CCS conference*, Raleigh, NC, 2012. (Acceptance: 29%)
7. **Approximate simulations for task-structured probabilistic I/O automata.**
Sayan Mitra and Nancy Lynch. In *LICS workshop on Probabilistic Automata and Logics (PAuL'06)*, Seattle, WA, August 2006.
8. **Reusable PVS proof strategies for proving abstraction properties of I/O automata.**
Sayan Mitra and Myla Archer. In *STRATEGIES 2004, IJCAR Affiliated Workshop on strategies in automated deduction*, Cork, Ireland, July 2004.
9. **Energy efficient connected clusters for mobile ad hoc networks.**
Sayan Mitra and Jesse Rabek In *Proceedings of 3rd Annual Mediterranean Ad Hoc Networking Workshop (MED-HOC-NET'04)*, Bodrum, Turkey, 2004.
10. **Specifying and proving timing properties with TIOA tools.**
Dilsun Kaynar, Nancy Lynch, and Sayan Mitra. In *Work in progress session of the 25th IEEE International Real-Time Systems Symposium (RTSS-WIP)*, Lisbon, Portugal, December 2004.
11. **Developing strategies for specialized theorem proving about untimed, timed, and hybrid I/O automata.**
Sayan Mitra and Myla Archer In *STRATA 2003, Workshop on Design and Application of Strategies/Tactics in Higher Order Logics*, Rome, Italy, September, 2003.

INVITED &
POSITION PAPERS
& MAGAZINE
ARTICLES

1. **Analyzing the cost of securing control systems.**
Zhenqi Huang, Yu Wang, Sayan Mitra, and Geir Dullerud. In *Next Wave: NSA's Journal on Emerging Technologies.*, 2015.
2. **Developing Programming Abstractions for Cyberphysical Systems.**
Sayan Mitra. *NSF Workshop on Transportation CPS*. January, 2014.
3. **Invariant Synthesis for Verification of Parameterized Cyber-Physical Systems with Applications to Aerospace Systems.**
Taylor T. Johnson and Sayan Mitra. *Cyber-physical Aerospace Systems at AIAA Infotech@Aerospace*, 2013.
4. **Design Automation Challenges in Automotive Cyber-Physical Systems.**
Sayan Mitra Presented at *NSF-NIST-USCAR Workshop for Developing Dependable and Secure Automotive Cyber-Physical Systems from Components*, Troy, MI, 2011.

PATENTS

1. **TF14195-02(US): Bounded Verification Through Discrepancy Computations.**
Sayan Mitra, Chuchu Fan, and Zhenqi Huang. 2015.

PRESENTATIONS

INVITED TALKS
AND SEMINARS

1. **Tools for auditing algorithms.**
 - Frontiers Series, Masters Program in Technology Management, University of Illinois College of Business, December 2, 2016.
2. **Safety verification for nonlinear and hybrid models with C2E2.**
 - ACM High Integrity Language Technology International Workshop on Model-Based Development and Contract-Based Programming (ESWeek), October 7, 2016.
3. **Optimal network resource allocation for monitoring dynamical systems.**
 - TCS Research, Innovation Labs, June 20th Kolkata 2016.
4. **Automating invariant and progress proofs for distributed systems.**
 - RiSE fellow seminar, TU Wien, Austria, December 8th 2016.
5. **From models and data to proofs for improving cyber-physical systems.**
 - *UTC Inst. for Advanced System Engineering, University of Connecticut, Sept. 19th, 2016.*
 - *Qualcomm San Diego Seminar Series, June 9, 2015.*
 - *Tenth Carnegie Mellon Conference on Electrical Industry: Testbeds for Smart Grids and Smart Cities, March 30, 2015.*
 - *CSE Colloquium Series, Michigan State University, March 27, 2015.*
 - *TSS Seminar, University of Illinois, Urbana-Champaign, Feb 24th, 2015.*
 - *Advanced Computing Seminar, Indian Statistical Institute, Kolkata, Jan 14th, 2015.*
 - *Invited Seminar, Robert Bosch Center for Embedded Systems, Indian Institute of Science, Bangalore Jan 8th, 2015.*
6. **Simulation-based verification of cyber-physical systems.**
 - *Control Systems Seminar, University of Michigan, December 4th, 2014.*
 - *Control Theory Seminar, University of California, Berkeley. October 27th, 2014.*
 - *Dagstuhl Seminar on Verification of Cyberphysical Systems, March 16-21st, 2014.*
 - *Department of Aerospace Engineering, Georgia Institute of Technology, April 9th, 2014.*
7. **Simulation-based verification of temporal precedence.** NASA Langley Formal Methods Group, January 9th, 2014.
8. **From simulations to verification: hybrid and distributed systems.**
 - *Computational Modeling and Analysis of Complex Systems (CMACS) Seminar, Carnegie Mellon University, May 10th, 2013.*
 - *Center for Information Systems and Engineering (CISE) Seminar, Boston University, April 24th, 2013.*
9. **Hybrid system verification: progress and simulations.**
 - *Information Systems Laboratory (ISL) Seminar, Stanford University, January 24th, 2013.*
 - *Design of Robotics and Embedded systems, Analysis, and Modeling Seminar (DREAMS), University of California at Berkeley, January 22th, 2013.*
 - *AFOSR Complex Systems review meeting, Washington DC, December, 2012.*
10. **Hybrid system verification: Some recent results.** *IMSE Seminar, 2013 Series, University of Illinois at Urbana-Champaign, January 16th, 2013.*
11. **Verification of cyber-physical systems: static and dynamic techniques.**
 - *Special Research Seminar, Department of Automation, Tsinghua University, April 20th, 2012.*
 - *Department of Mechanical Engineering, Beijing University, April 16th, 2012.*
12. **Automatic verification of region stability of embedded systems.**

- *CSE Seminar, Indian Institute of Technology, Kharagpur, January 12th, 2012.*
 - *Indian Statistical Institute, Kolkata, January 11th, 2012.*
 - *IEEE Calcutta Section in collaboration with Electrical Engineering Department of Jadavpur University, January 10th, 2012.*
13. **Verifying inevitability of hybrid systems.** *Decision and Control Laboratory Seminar Series, Georgia Institute of Technology, December 1st, 2011.*
 14. **Automatic verification of region stability.**
 - *University of California, Los Angeles, October 5th, 2011.*
 - *IST Seminar Series, California Institute of Technology, October 4th, 2011.*
 - *CCDC Seminar Series, University of California, Santa Barbara, October 7th, 2011.*
 15. **Distributed cyber-physical systems: algorithms and verification.** *Research Seminar, Wright-Patterson Air-Force Base, Dayton, Ohio, July 20th, 2011.*
 16. **Abstractions for verification of hybrid systems.**
 - *Research Seminar, Kirtland Air-Force Base, Albuquerque, New Mexico, June 15th, 2011.*
 - *Control System Group Seminar, Department of Electrical and Computer Engineering, University of New Mexico, June 16th, 2011.*
 17. **Abstractions for safety and stability verification of cyber-physical systems.** *PRECISE Seminar, University of Pennsylvania, PA, March 2011.*
 18. **Abstraction-refinement for hybrid system verification: an air-traffic control case study.** *2nd Workshop on Formal Methods for Aerospace (FMA) in conjunction with IEEE Conference on decision and control (CDC), Atlanta, 2010.*
 19. **Verification of hybrid systems through abstractions and approximations.** *Workshop on Hybrid Dynamic Systems 2010, at the University of Waterloo, Canada.*
 20. **Virtual infrastructure for programming mobile robots.** *Special Research Seminar at the Microsoft Research India, in Bangalore, India, December 2009.*
 21. **Replication-based fault-tolerance of wireless distributed control systems.** *CalTech Verification and Validation Workshop, Pasadena, CA, September 2009.*
 22. **Virtual infrastructure for programming mobile robots.** *Workshop on Formal methods for Robotics and Automation Workshop at the 2009 IEEE International Conference on Robotics and Automation (ICRA), in Kobe, Japan, May 2009.*
 23. **Proving convergence: From synchronous to partially synchronous systems.** *Computer Engineering Seminar Series at UIUC, Urbana, IL, October 2008.*
 24. **Verifying hybrid systems: stability and implementations.** *Self-Organizing Systems group seminar, University of Washington, Seattle, WA, January 2007.*
 25. **Verifying hybrid systems.** *CMI Seminar Series at Caltech, Pasadena, CA, February 2008.*
 26. **On building PVS interfaces for abstraction proofs.** *CHACS Seminar, Naval Research Lab, Washington D.C., August 2003.*
- CONFERENCE PRESENTATIONS
1. **Entropy and minimal data-rates for state estimation and model detection.** *International conference on Hybrid Systems: Computation and Control, CPSWeek 2016, Vienna, Austria, April 2016.*
 2. **Data-driven safety verification of nonlinear and hybrid models with C2E2.** *ACM High-Integration Language Technologies International Workshop, ESWeek 2016, Pittsburgh, PA, October 7th 2016.*
 3. **StarL: Towards a unified framework for programming, simulating and verifying distributed robotic systems.** *LCTES 2015, held as part of FCRC, Portland, OR, June 2015.*

4. **Privacy preserving distributed optimization.**
16th International Conference on Distributed Computing and Networking, Goa, India. Jan 2015.
5. **Simulation-based Verification of Cyberphysical Systems.**
Toyota Summit on Industrial Cyberphysical Systems, December 18th, 2014.
6. **Proving Abstractions from Numerical Simulations for Security Properties of Cyberphysical Systems.**
HOTSOS 2012, Raleigh, April 2014.
7. **Static and Dynamic Analysis of Timed Distributed Traces.**
RTSS 2012, San Juan, Puerto Rico, December 2012.
8. **Parameterized Verification of Cyber-Physical Systems: A Aircraft Landing Protocol Case Study.**
ICCPs 2012, CPSWeek, Beijing, PRC, April 2012.
9. **Lyapunov Abstractions for Inevitability of Hybrid Systems.**
HSCC 2012, CPSWeek, Beijing, PRC, April 2012.
10. **Stability Verification of Digitally-Interconnected Linear Systems.**
CDC-ECC 2011, Orlando, FL, December 2011.
11. **Stability of Distributed Algorithms in the face of Incessant Faults.**
International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS'09), Lyon, France. November 2009.
12. **Proving Approximate Implementations.**
CMI Retreat'07, Los Angeles, CA, October 2007.
13. **Learning Cycle-Linear Hybrid Automata for Excitable Cells.**
HSCC'07, Pisa, Italy, April 2007.
14. **Approximate Simulations for Task-PIOAs.**
Workshop on Probabilistic Automata and Logics (PAuL'06) (Affiliated with LICS'06), Seattle, WA, August 2006.
15. **Verifying Average Dwell Time through Optimization.**
Hybrid Systems: Computation and Control (HSCC'06), Santa Barbara, CA, March 2006.
16. **Translating TIOA specs for Theorem Proving in PVS.**
Formal Modelling and Analysis of Timed Systems (FORMATS'05), Uppsala, Sweden, September 2005.
17. **Stability Verification of TIOA.**
Timed I/O Automata Workshop, MIT, Cambridge, MA, December, 2005.
18. **Reusable PVS proof strategies for proving abstraction properties of I/O automata.**
STRATEGIES Workshop (Affiliated with IJCAR'04), Cork, Ireland, July 2004.
19. **Safety Verification of Model Helicopter Controller.**
Hybrid Systems: Computation and Control (HSCC'03), Prague, Czech Republic, April 2003.

ADVISING

DOCTORAL THESES

- ◇ Taylor Johnson (ECE, University of Illinois, 2013)—*Uniform verification of safety for parameterized networks of hybrid automata.*
First position (2013): Assistant Professor of Computer Science, University of Texas at Arlington.
Currently position (2016): Assistant Professor of Computer Science, Vanderbilt University.
- ◇ Parasara Sridhar Duggirala (CS, University of Illinois. 2015)—*Verification of hybrid systems through abstraction refinement.*
First position (2015): Assistant Professor of Computer Science and Engineering, University of Connecticut.

- ◇ Zhenqi Huang (ECE, University of Illinois, 2013–2016)—*Compositional analysis of networked cyber-physical systems: Safety and Privacy*.
First position (2016): Dispatch.ai.
- MASTERS THESES
- ◇ Matthew Potok (ECE, University of Illinois, tentatively 2018)—*Safe machine learning and applications to smart manufacturing systems*.
 - ◇ Hussein Sibaie (ECE, University of Illinois, tentatively 2017)—*Entropy and minimal data rate estimation for switched and hybrid systems*.
 - ◇ Nicole Chan (ECE, University of Illinois, tentatively 2017)—*Controller design approaches for hybrid systems*.
 - ◇ Shuting Li (ECE, University of Illinois, 2018)—*Online interfaces for programming distributed robotics*.
 - ◇ Bolun Qi (ECE, University of Illinois, Summer 2018)—*An interactive verification framework with reachtubes*.
 - ◇ Yixiao Lin (ECE, University of Illinois, 2016)—*A modular architecture for programming and simulation of distributed robotic systems*.
 - ◇ Chuchu Fan (ECE, University of Illinois, 2016)—*Automatic computation of discrepancy of non-linear models*.
 - ◇ Ritwika Ghosh (CS, University of Illinois, tentatively 2017)
 - ◇ Zhenqi Huang (ME, University of Illinois, 2013)—*On simulation-based verification on nonlinear and nondeterministic hybrid systems*.
 - ◇ Adam Zimmerman (ECE, University of Illinois, 2012)—*StarL for programming reliable robotic networks*.
 - ◇ Jeremy Green (ECE, University of Illinois, 2012)—*Compositional bounded reachability using time partitioning and abstraction*.
 - ◇ M. S. Karthikeyan (ECE, University of Illinois, 2011)—*Tranlation of Simulink-Stateflow Models to Hybrid Automata*.
 - ◇ Berenice Carrasco Cabrera (ECE, University of Illinois, 2011)—*Opportunistic clock synchronization for ad hoc networks*.
 - ◇ Taylor Johnson (ECE, University of Illinois, 2010)—*Fault-tolerant distributed cyber-physical systems: two case studies*. Received **Most Interesting CPS Research Problem Prize** at the 2009 Ph.D. Student Forum on Cyber-Physical Systems organized under the aegis of *IEEE Real Time Systems Symposium* for a position paper.
- UNDERGRAD. THESES
- ◇ Shuting Li (ECE, University of Illinois, Summer 2016)—*An online playground for distributed robotics*.
 - ◇ Liyi Sun (ECE, University of Illinois, Summer 2016)—*A comparison of share memory algorithms for distributed robotics*.
 - ◇ Bolun Qi (ECE, University of Illinois, Summer 2016)—*Parallelizing simuliob-based model checking*.
 - ◇ Shengliang Dai (ECE, University of Illinois, Summer 2015)—*Expectation invariants for randomized programs*
 - ◇ Matthew Potok (ECE, University of Illinois, Summer 2014)—*Frontend for C2E2 verification tool*.
 - ◇ Yixiao Lin (ECE, University of Illinois, Spring 2013)—*Programming for distributed coordination*.
 - ◇ Le Wang (ECE, University of Illinois, Spring 2013)—*Verification of SAPA-ALAS landing protocol*.
 - ◇ Lucas Buccafusca (CS, University of Colorado, Summer 2012)—*Flocking algorithms for StarL*.
 - ◇ Matthew Johnson (CS, University of Illinois, 2012)—*StarL: Application development for distributed robotics platform on Android*.

- ◇ Yaming Tang (ECE, University of Illinois. 2011-2012)— *Image processing on Android*.
- ◇ Danyang Zhuo (ECE, University of Illinois. 2011-2012)— *Ad hoc networking on Android Phones*.
- ◇ Zhongdong Zhu (ECE, University of Illinois. 2011-present)— *Distributed Flows Simulation*.

DOCTORAL
DISSERTATION
COMMITTEES

- ◇ Fardin Taghi Abad (CS, University of Illinois, 2017) Thesis advisor: Marco Caccamo.
- ◇ Guosong Yang (ECE, University of Illinois, 2017)—Switched and hybrid systems with inputs: Small-gain theorems and finite data-rate feedback stabilization. Thesis advisor: Daniel Liberzon.
- ◇ Seyed Nematollah Ahmadyan (ECE, University of Illinois, 2016)—Randomized algorithms for validation of nonlinear analog circuits. Thesis advisor: Shobha Vasudevan.
- ◇ Abdullah Al-Nayeem (CS, University of Illinois, May 2013)—Physically-Asynchronous Logically-Synchronous (PALS) System Design and Development. Thesis advisor: Lui Sha.
- ◇ Stanley Bak (CS, University of Illinois, May 2013)—(tentative) Simplex-based Design and Verification of Cyberphysical Systems. Thesis advisor: Marco Caccamo.
- ◇ Jingjin Yu (CS, University of Illinois, Feb 2013)—Combinatorial Structures and Filter Design in Information Spaces. Thesis advisor: Steven M. Lavalle.
- ◇ Ghazale Hosseinabadi (ECE, University of Illinois, May 2012)—Exploiting Wireless Broadcast Property to Improve Performance of Distributed Algorithms and MAC protocols in wireless networks. Thesis advisor: Nitin Vaidya.
- ◇ Douglas Eskins (CS, University of Illinois, 2012)—Modeling Human Decision Points in Complex Systems. Thesis advisor: William Sanders.
- ◇ Vijay Raman (CS, University of Illinois, December 2011)—Traffic Aware Channel Allocation and Routing in Multi-Channel Multi-Radio Wireless Networks. Thesis advisor: Nitin Vaidya.
- ◇ Aneel Tanwani (ECE, University of Illinois, November 2011)—Invertibility and Observability of Switched Systems with Inputs and Outputs. Thesis advisor: Daniel Liberzon.
- ◇ Kyoung-Dae Kim (ECE, University of Illinois, May 2011)—Middleware and Control of Cyber-Physical Systems: Temporal Guarantees and Hybrid Systems Analysis. Thesis advisor: P. R. Kumar.
- ◇ Pavithra Prabhakar (CS, University of Illinois, June 2011)— Approximation Based Safety and Stability Verification of Hybrid Systems. Thesis advisor: Mahesh Viswanathan.

SPONSORED
RESEARCH
PROJECTS

CURRENT
PROJECTS

- ◇ *CPS Frontiers: Collaborative Research: Software Defined Control for Smart Manufacturing Systems* (\$4,000,000, 4 years, 2016-2020), supported by NSF (PI: Dawn Tilbury, co-PI: Kira Barton, Morley Mao, Sibin Mohan, Sayan Mitra, Elaine Shi)
- ◇ *CRI: CyPhyHouse: A laboratory for evolving distributed and mobile cyber-physical systems research* (\$610,000, 3 years, 2016-2019), supported by NSF (PI: Sayan Mitra, co-PI: Geir Dullerud and Nitin Vaidya).
- ◇ *From Simulations to Proofs for Cyber-Physical Systems* (\$500,000, 3 years, 2014-2017), supported by NSF (PI: Sayan Mitra, co-PI: Mahesh Viswanathan)
- ◇ *Static-Dynamic Analysis of Security Metrics of Cyber-Physical Systems* (\$750,000, 3 years, 2014-2017), supported by NSA (PI: Sayan Mitra, co-PI: Geir Dullerud, Swarat Chaudhuri)
- ◇ *Algorithms and Verification for Reliable Distributed Cyber-Physical Systems* (\$488,000, 5 years, 2011-2016), supported by NSF (PI: Sayan Mitra)

- PAST PROJECTS
- ◇ *Security of Cyber-Physical Systems* (\$185,000 1 year, 2012–2013), supported by NSA (PI: Sayan Mitra, co-PI: Geir Dullerud)
 - ◇ *VEHN: Verification Engines for Hybrid Networks* (\$500,000, 4 years, 2012–2015), supported by AFOSR (PI: Sayan Mitra)
 - ◇ *A debugger for mobile systems* (\$180,000,3 years, 2012–2015), supported by Samsung (PI: Sayan Mitra)
 - ◇ *Model-Based Design: Theory, Toolkit, and Benchmarks* (\$62,000, 1 year, 2011–2012), sponsored by John Deere (PI: Sayan mitra).
 - ◇ *Middleware for Wireless Distributed Systems* (3 years, 2010–2013), sponsored by Boeing (\$400,000, PI: Nitin Vaidya, co-PI:Sayan mitra).
 - ◇ *Verification of Simulink/Stateflow models* (\$500,000, 3 years, 2009–2012), supported by NSF (PI: Sayan Mitra, co-PI:Mahesh Viswanathan)
 - ◇ *Embedded Safety Critical Application Programming Environment: Advancing the theory, the tool and benchmarking* (\$80,000, 1 year, 2010–2011), sponsored by John Deere (PI: Sayan mitra).
 - ◇ *Hybrid system verification research* (\$50,000, 1 year, 2009–2010), sponsored by Rockwell Collins Inc. (PI: Sayan Mitra).
 - ◇ *Hardware Simplex-based controller synthesis* (\$80,000, 1 year, 2009–2010), sponsored by John Deere (PI: Marco Caccamo, co-PI: Sayan mitra).

SERVICE

- PROGRAM COMMITTEE, EDITORSHIP, AND OTHER SERVICES
- ◇ ACM SIGBED International Conference on Embedded Software (EMSOFT 2017).
 - ◇ 14th International Conference on Quantitative Evaluation of Systems (QEST 2017).
 - ◇ Program chair and editor (with Goran Frehse) for Proceedings of 20th ACM Intl. Conf. on Hybrid Systems: Computation and Control (HSCC 2017).
 - ◇ Inaugural Workshop on Science of Security of Cyberphysical systems, at CPSWeek 2016, Vienna, Workshop Organizer and Co-Chair.
 - ◇ Real-Time Systems Symposium (RTSS 2016).
 - ◇ Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2016).
 - ◇ External Review Committee member of Computer-Aided Verification (CAV'16).
 - ◇ 19th ACM Intl. Conf. on Hybrid Systems: Computation and Control (HSCC 2016).
 - ◇ 12th International Conference on Quantitative Evaluation of Systems (QEST 2015)
 - ◇ ACM SIGPLAN Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES'15).
 - ◇ Symposium and Bootcamp on the Science of Security (HotSoS 2015).
 - ◇ 18th ACM Intl. Conf. on Hybrid Systems: Computation and Control (HSCC 2015).
 - ◇ Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2015).
 - ◇ Farm to Fork Symposium: Nanosensor networks and Exabyte Analysis. Urbana-Champaign (Chair, panel on sensor networks) 2014.
 - ◇ IEEE Symposium on Software Reliability Engineering (ISSRE 2014).
 - ◇ Real Time Systems Symposium (RTSS 2014).
 - ◇ Summer Computer Simulation Conference (2014).
 - ◇ Applied Verification for Continuous and Hybrid Systems (ARCH 2014).
 - ◇ 3rd Intl. Conf. on High Confidence Networked Systems (HiCons 2014).
 - ◇ The Euromicro Conference on Digital System Design (DSD), Special Session on Design of Cyber-physical systems, 2013.
 - ◇ 4th IEEE/ACM Intl. Conf. on Cyber-Physical Systems (ICCPS 2013).

	<ul style="list-style-type: none"> ◇ 16th ACM Intl. Conf. on Hybrid Systems: Computation and Control (HSCC 2013). ◇ Robotics Science and Systems Conf. (RSS 2012), Sydney, Australia. ◇ 14th Intl. Symp. on Stabilization, Safety, and Security of Distributed Systems (SSS 2012). ◇ 15th ACM Intl. Conf. on Hybrid Systems: Computation and Control (HSCC 2012). ◇ 12th Intl. Conf. on Distributed Computing and Networking (ICDCN 2011). ◇ 14th ACM Intl. Conf. on Hybrid Systems: Computation and Control (HSCC 2011). ◇ Cyber-Physical Systems Week (CPSWeek 2011). ◇ 1st Intl. Workshop on Rewriting Techniques for Real-Time Systems (RTRTS 2010). ◇ 11th Intl. Symp. on Stabilization, Safety, and Security of Distributed Systems (SSS 2009). ◇ 13th Intl. Conf. on Hybrid Systems: Computation and Control (HSCC 2010).
EXTERNAL JOURNAL REVIEWING	<ul style="list-style-type: none"> ◇ Formal Methods in System Design ◇ IEEE Transactions on Software Engineering ◇ Automatica ◇ IEEE Transactions on Automatic Control ◇ Theoretical Computer Science ◇ IEEE Systems, Man and Cybernetics ◇ IEEE Transactions on Computers ◇ ACM Transactions on Embedded Computing Systems ◇ Journal of Automated Reasoning ◇ Journal of Discrete Algorithms ◇ Journal of Aerospace, Computing, Information, and Communication ◇ Journal of Performance Evaluation
TECHNICAL SOCIETY MEMBERSHIPS	<ul style="list-style-type: none"> IEEE Senior Member, ACM, HKN IEEE Technical Committee on Computational Aspects of Control System Design (TC-CACSD) IEEE Technical Committee on Hybrid Systems
LANGUAGES	English, Bangla, Hindi
CITIZENSHIP	Citizen of India. Permanent resident of USA.