

PROF. RATNESH KUMAR, PHD, FELLOW IEEE, FELLOW AAAS
Iowa State Univ., Dept. of Elec. & Comp. Eng.; Dept. of Computer Sc.
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EDUCATION

Ph.D., **Elec. & Comp. Eng., Univ. of Texas at Austin**, August 1991 (GPA 4.0/4.0).
M.S., **Elec. & Comp. Eng., Univ. of Texas at Austin**, August 1989 (GPA 4.0/4.0).
B.Tech., **Elec. Eng., Indian Inst. of Tech. Kanpur**, India, May 1987 (GPA 10.0/10.0).

ACADEMIC EXPERIENCE

August 2005-Present: Professor, **Department of Electrical and Computer Engineering, Iowa State University**, Ames, IA.
July 2012-Present: Professor (Courtesy Appointment), **Department of Computer Science, Iowa State University**, Ames, IA.
August 2002-2005: Associate Professor, **Department of Electrical and Computer Engineering, Iowa State University**, Ames, IA.
July 1997-July 2002: Associate Professor, **Department of Electrical and Computer Engineering, University of Kentucky**, Lexington, KY.
August 1991-June 1997: Assistant Professor, **Department of Electrical Engineering, University of Kentucky**, Lexington, KY.
Summers 1992, 1995: Visiting Faculty, **Department of Electrical Engineering and Systems Research Center, University of Maryland**, College Park, MD.
Fall 1989-Summer 1991: Graduate Research Assistant, **Department of Electrical and Computer Engineering, University of Texas at Austin**.
Fall 1987-Summer 1989: Graduate Fellow, **Department of Electrical and Computer Engineering, University of Texas at Austin**.

INDUSTRIAL AND OTHER NON-ACADEMIC EXPERIENCE

Fall 2015-Summer 2016: Consultant, **Wright-Patt Air Force Research Lab**, Dayton, OH.
Fall 2008: Visiting Scientist, **United Technology Research Center**, Hartford, CT.
Summer 2001: Visiting Scientist, **Argonne National Laboratory—West**, Idaho Falls, ID.
Summers 2000, 1999, August 1997-98: Visiting Scientist, **Applied Research Laboratory**, Pennsylvania State University, State College, PA.
Summer 1996: Visiting Faculty, **NASA-Ames**, Division of Human and Systems Technology, Moffett Field, California.
June 1987-August 1987: Research Engineer, Research and Development Group, **Hindustan Computers Limited**, Telecommunication Division, New Delhi, India.

HONORS AND RECOGNITIONS

Invited to **IIT Kanpur Distinguished Alumni Meeting**, NYC, 2024—Shared panel led by Dr. Arvind Krishna, IBM CEO
Distinguished Alumni Award, Indian Institute of Technology, Kanpur, 2022.
AAAS Fellow, 2018, *for distinguished contributions to discrete-event and cyberphysical systems, embedded software, agri-, bio- and environmental sensors, and energy harvesting*.
Iowa State University Award for Outstanding Achievement in Research, 2022.
Palmer Professor, Dept. of Electrical and Computer Eng., Iowa State Univ., 2021-Present.
Harpole Professor, Dept. of Electrical and Computer Eng., Iowa State Univ., 2017-2021.
D. R. Boylan Eminent Faculty Award for Research, Iowa State University, 2019.
Distinguished Lecturer, IEEE Control Systems Society, 2015-Present.
IEEE Fellow, 2007 *“for contributions to discrete event system modeling, control, diagnosis and applications*.
People in Control article, *IEEE Control Systems Magazine*, 2013.

Best Transactions Paper, 2016, *IEEE Transactions on Automation Science and Engineering*, "Fault Detection of Discrete-Time Stochastic Systems Subject to Temporal Logic Correctness Requirements" vol. 12, no. 4, pp. 1369-1379, 2015.

Keynote Speaker, 2019 *International Conference on Contemporary Computing*, New Delhi, India.

Best Paper Award finalists, 2019, *International Conference on Informatics in Control, Automation, and Robotics*, "ReLIC: 'Reduced Logic Inference for Composition' for Quantifier Elimination based Compositional Reasoning", July 2022, Prague, Czech Republic.

Best Student Paper Finalist, 2016, *IEEE Sensors Conference*, "Patterning of nanophotonic structures at optical fiber tip for refractive index sensing", Oct. 2016, Orlando, FL.

Representative Delegate, 2017, of IEEE Central Iowa Section at the *IEEE Sections Congress*, Sydney, Australia, Aug. 2017.

Plenary Speaker, 2014 Int. Conf. on Information Technology, Bhubneshwar, India.

Plenary Speaker, 2014 IEEE International Workshop on Discrete Event Systems, Paris, France.

Best Conference Paper Finalist Award, 2014, *IEEE International Conference on Networking, Sensing and Control, IEEE SMC Society*, Miami, FL.

Best Student Paper Finalist Award, 2014, *IEEE International Conference on Networking, Sensing and Control, IEEE SMC Society*, Miami, FL.

Program Co-Chair, 2009 International Workshop on Software Cybernetics (held concurrently with IEEE COMPSAC).

Keynote Speaker, 2008 IEEE International Workshop on Software Cybernetics (co-hosted with IEEE COMPSAC), Turku, Finland.

IEEE Fellow Committee for System, Man, and Cybernetics Society, 2017-Present.

IEEE Fellow Committee for Control System Society, 2009.

General Co-Chair, International Workshop on Discrete Event 2008.

Associate Editor, Sensors—MDPI, 2018-Present.

Associate Editor, IEEE Transactions on Systems, Man and Cybernetics: Systems, 2017-Present.

Associate Editor, IET Cyberphysical Systems: Theory and Applications, 2016-Present.

Associate Editor, ACM Transactions on Embedded Computing Systems, 2014-2020.

Associate Editor, International Journal on Discrete Event Control Systems, 2009-Present.

Associate Editor, Journal of Discrete Event Dynamical Systems, 2005-2009.

Associate Editor, SIAM Journal on Control and Optimization, 1999-2007.

Associate Editor, IEEE Transactions on Robotics and Automation, 2000-2002.

Associate Editor, IEEE Conf. on Decision and Control, 1996-2015.

Associate Editor, American Control Conference, 1996-2015.

Steering Committee, International Workshop on Software Cybernetics (held concurrently with IEEE COMPSAC), 2009-2015.

Idaho National Lab. (Argonne National Lab., West) Summer Faculty Fellowship 2001.

Senior Member, IEEE, 2000.

Sabbatical Faculty Fellowship, Applied Research Lab.—Penn State University, 1997-98.

NASA-ASEE Summer Faculty Fellowship Award for the year 1996.

Research Initiation Award for the years 1994-1997, National Science Foundation.

Best Dissertation for the year 1991, Department of Electrical and Computer Engineering, University of Texas at Austin.

Microelectronics and Computer Development Fellowship for the years 1987-89, University of Texas at Austin.

Ratan Swarup Memorial Gold Medal for being the best all rounder student for the year 1987, Indian Institute of Technology Kanpur, India.

Lalit Narain Das Memorial Gold Medal for being the best undergraduate student in Electrical Engineering for the year 1987, Indian Institute of Technology Kanpur, India.

Proficiency Prize for the **Best Project Work** in Electrical Engineering for the year 1987, Indian Institute of Technology Kanpur, India.

GRANTS AND CONTRACTS

A. From NSF

1. **R. Kumar (PI)**, C. Huang and M. Pathak (Co-PI), \$650,000 NSF-ECCS (\$400,000 USA; \$250K India), "[NSF-MeitY: Fundamental Realizable Limit Vibration Energy Harvesting: Design, Analysis, and Implementation](#)", Aug. 15, 2024-July 31, 2027.
2. **R. Kumar (PI)** and S. Tabassum (Co-PI), \$250,000 NSF-PFI-TT, "[A Fiber-Optic Sensing System for Multiplexed Gas Detection](#)", March 15, 2022-Feb. 29, 2024.
3. **R. Kumar (PI)**, \$600,000 NSF-CSSI, "[Elements: Agricultural Cyber-infrastructure support for Field and Grid Modeling, and Runtime Decision-Making](#)", May 15, 2020- April 30, 2023.
4. **R. Kumar (PI)**, \$55,000 NSF-INTERN Supplement, "[Prototype Development: Flexible Energy Harvester Band for Wearable Sensors](#)" (Supplement to: "PFI:AIR - TT: In-Situ Wireless Soil Sensor for Moisture, Salinity and Ions"), Sept. 6, 2019-June 30, 2020.
5. **R. Kumar (PI)**, \$50,000 NSF-INTERN Supplement, "[In-vivo Glucose Sensor Design and Testing on Animal Models](#)" (Supplement to: "CyberSEES: Type2: In-Situ, Wireless, Energy-Harvesting Soil Moisture/Nutrient Sensors for Managing Agricultural Resources & Environmental Impacts"), Dec. 1, 2018-Aug. 31, 2019.
6. **R. Kumar (PI)**, \$40,000 NSF-INTERN Supplement, "[Development and Integration of Energy Harvesters with Environmental Sensors](#)" (Supplement to: "PFI:AIR - TT: In-Situ Wireless Soil Sensor for Moisture, Salinity and Ions"), August 1, 2018-June 30, 2019.
7. **R. Kumar (PI)**, "[PFI:AIR - TT: In-Situ Wireless Soil Sensor for Moisture, Salinity and Ions](#)", NSF, \$200,000, May 1, 2016-June 30, 2019.
8. **R. Kumar (PI)**, NSF-ECCS, \$350,000, "[Model-based System-Level Testing/Validation](#)", Aug. 15 2015-July 31 2019.
9. **R. Kumar (PI)**, M. Castellano, L. Dong, F. Miguez, and R. E. Weber, NSF, \$1M, "[CyberSEES: Type2: In-Situ, Wireless, Energy-Harvesting Soil Moisture/Nutrient Sensors for Managing Agricultural Resources & Environmental Impacts](#)", August 16, 2013-August 30, 2019.
10. **R. Kumar (PI)**, S. Birrell, R. Weber, A. Kamal, and A. Kaleita, \$460,949, "[Soil Sensors and their Wireless Underground Network for Precision Farming and Environmental Management](#)", Sept. 15 2009-August 31, 2015, NSF.
11. **R. Kumar (PI)** and C. Zhou, \$300,000, "[Model-based Test Generation for Embedded Software with Simulink/Stateflow or Hybrid Automata Models](#)", May 1, 2008-April 30, 2011, NSF.
12. **R. Kumar (PI)** and S. Jiang, \$360,000, "[GOALI: Monitoring and Reconfiguration for Fault-Tolerance of Embedded Control Software with Automotive Applications](#)", June 1, 2008-May 31, 2011, NSF.
13. **R. Kumar (PI)**, A. Kamal, and S. Birrell, \$239,999, "[Cyber-Systems: Development of Soil Sensors and their Underground Wireless Network for Fertilization Management to Minimize Environmental Impact](#)", May 1, 2006- April 30, 2010, NSF.
14. **R. Kumar (PI)**, \$210,000, "[Nondeterministic Control of Discrete-Event Systems for Language or \(Bi\)Simulation Equivalence Specifications](#)", Sept. 1, 2004-August 31, 2007, NSF.
15. J. McCalley, **R. Kumar (Co-PI)**, O. Volij, V. Ajjarappu, N. Elia, V. Vittal, \$350,000 "[EPNES: Planning Reconfigurable Power System Control for Transmission Enhancement with Cost-Recovery System](#)", Sept. 1, 2003-Aug. 31, 2006, NSF.
16. **R. Kumar** (Iowa State Univ PI) and A. Arapostathis (Univ. of Texas PI), \$333,967 "[Control of Markov Chains with Qualitative Constraints](#)", Sept. 1, 2002-Aug. 31, 2006, NSF.
17. **R. Kumar (PI)**, \$237,848, "[Control and Diagnosis of Discrete-Event Systems with Temporal Logic Specifications](#)", August 16, 2002-August 15, 2006, NSF.
18. **R. Kumar (PI)**, \$168,191, "[Modeling, Interface Design, and Verification of Hybrid and Discrete Event Systems](#)", October 1, 1997-Sept. 30, 2001, NSF.
19. **R. Kumar (PI)**, National Science Foundation and Univ. of KY, \$1,900 (\$900 NSF), "Travel support for 1996 IEEE Conf. on Decision and Control, Japan, Dec. 1996.
20. M. Truszczyński, R. A. Finkel, J. N. Griffioen, J. E. Lumpp, R. S. Yavatkar, **R. Kumar (Co-PI)**, L. E. Holloway, \$1,498,765 "[CISE Research Infrastructure: A Laboratory for Research in High Performance Distributed Computing](#)", July 15, 1995-June 30, 2001, NSF.

21. **R. Kumar (PI)**, Research Initiation Award \$89,982, "[Real-Time Discrete Event Control and its Applications to Automated Manufacturing Systems](#)", August 31, 1994–July 31, 1997, NSF.
22. **R. Kumar (PI)**, National Science Foundation and Univ. of KY, \$1,900 (\$400 NSF), "Travel support for 1994 Workshop on Discrete Event Systems, France", June 1994.

B. From DoD/ARL/AFRL; DoE/ANL; NASA

1. **R. Kumar (PI)**, Hao Ren, \$91,500, AFRL, "Quantifier-Elimination Based Compositional Reasoning Framework and Application to UxAS", May 1, 2017–August 31, 2017.
2. **R. Kumar (PI)**, Air Force Research Lab, \$50,000, "Quantifier Elimination Techniques and Tools and Application to Software Verification", Aug. 16, 2015–Aug. 15, 2016.
3. **R. Kumar (PI)**, Air Force Research Lab, \$27,500, "Run Time Assurance", Dec. 1, 2011–March 31, 2012.
4. **R. Kumar (PI)**, Applied Research Laboratory, Penn. State Univ., \$2000, "Travel support for attending IEEE International Symposium for Intelligent Control", Sept. 1998.
5. **R. Kumar (PI)**, Applied Research Laboratory, \$39,000, "Sabbatical Research at Applied Research Laboratory, Penn. State Univ.", August 16, 1997–August 15, 1998.
6. **R. Kumar (PI)**, Office of Naval Research, \$355,609, "Research on Ale's Intelligent Control Architecture", April 1, 2001–March 31, 2005.
7. **R. Kumar (PI)**, Argonne National Laboratory, \$25,000, "Diagnosis of Repeatable Faults in Discrete Event Systems" July 1, 2001–Sept. 30, 2001.
8. J. C. Yingling, J. Sottile, and **R. Kumar (Co-PI)**, Dept. of Energy KY/EPSCoR, \$108,104 "Supporting Technologies for Effective Use of On-line Analyzers in Control of Coal Quality", Sept. 1, 1996–Aug. 31, 1999.
9. **R. Kumar (PI)**, NASA-ASEE Summer Faculty Fellowship, \$12,229, June 10, 1996–Aug. 16, 1996.

C. From Industry; University

1. **R. Kumar (PI)**, \$25,000, Adobe Systems, Inc., April 2024.
2. **R. Kumar (PI)**, \$76,500, Reagents Innovation Fund (RIF), Iowa State University, "Designing an Ultra-low-powered IoT System for Energy Harvester Integrated Battery-free Operation", Sept. 1, 2022–June 30, 2023.
3. **R. Kumar (PI)**, \$76,500, Reagents Innovation Fund (RIF), Iowa State University, "Self-powered Wireless IoT for Structural Health Monitoring: Integrated Vibration Sensor and Energy Harvester", Sept. 1, 2021–June 30, 2022.
4. **R. Kumar (PI)**, \$40,000, ERI-ISU, "Wearable Triboelectric Energy Harvester", Jan.'18–Aug.'18.
5. **R. Kumar (PI)**, \$112,500, Texas Instruments, "Research on Soil Sensors for Precision Agriculture", July 1, 2017–Dec. 31, 2018.
6. **R. Kumar (PI)**, \$104,995, Reagents Innovation Fund (RIF), Iowa State University, "In-Situ Wireless Soil Moisture, Salinity, Nitrate and other Nutrients/Ion Sensing: Phase II", August 1, 2016–Aug 31, 2017.
7. **R. Kumar (PI)**, \$50,000, Security and Software Engineering Research Center (S2ERC) with support from Rockwell Collins, "Attack Graph Modeling and Analysis", May 16, 2016–May 15, 2017.
8. **R. Kumar (PI)**, \$109,900, Reagents Innovation Fund (RIF), Iowa State University, "In-Situ Wireless Soil Moisture and Salinity Sensor and Ionic Sensing Extension", August 1, 2015–May 31, 2016.
9. **R. Kumar (PI)**, \$101,557, Honeywell Advanced Tech. Center, "SMT Solver Support in HiLite Software", Aug. 24, 2015–Dec. 30, 2016.
10. **R. Kumar (PI)**, \$50,000, Security and Software Engineering Research Center (S2ERC) with support from Pacific Northwest National Lab (PNNL) and John Deere, "Metrics for Secrecy and Resiliency for Cyber-Physical Systems", August 16, 2014–May 15, 2015.
11. **R. Kumar (PI)**, \$102,500, Adobe Systems, Inc., "Effective Prediction of Dropoff Rate for Online Video Sessions", Jan. 1, 2013–Aug. 15, 2016.
12. **R. Kumar (PI)**, \$87,600, General Motors R&D, "Linear Hybrid System Verification Tool", Jan. 1, 2009–Dec. 31, 2010.

13. **R. Kumar (PI)**, \$74,241, Magnatech Inc., "Remote Diagnosis of Machines", Jan. 1, 2008-Dec. 31, 2008.
14. **R. Kumar (PI)** and A. Kamal, \$32,500, ICUBE, ISU, "Wireless Soil Sensor Network Research", S09, S08, Summer07, S07, S04.
15. **R. Kumar (PI)**, \$150,000, ISU, "New Faculty Start-Up Grant", Aug. 16, 2002-Aug. 15, 2005.
16. **R. Kumar (PI)**, \$7,200, ISU Travel Supports, "Foreign Travel Grant", Dec. 2014, Aug. 2012, April 2007, April 2003; "Transportation-CPS", Jan. 2014; "PVS Workshop at NASA-Langley", SEA Fund, April 2003 (about \$1200 each travel).
17. **R. Kumar (PI)**, \$59,580, Univ. of KY Research Support, Center for Manufacturing Systems, \$13,200, "Optimization of Lexmark's Electronic Assembly Line", July 1, 1996-June 30, 1997; Univ. of KY Research Committee Grant, \$4,980, "Optimization Problems in Automated Electronic Card Projection Lines", July 1, 1995-June 30, 1996; Center for Mfg. Systems, \$6,000, "Assembly Time Optimization in Printed Circuit Board Assembly", Jan. 1, 1994-Dec. 31, 1994; Center for Mfg. Systems, Univ. of KY, \$18,000 "Optimizing Sequencing Techniques for Pick-and-Place Robots", July 1, 1993-Dec. 31, 1994; Center for Mfg. Systems, \$6,000, "Efficient Techniques for Surface Mount Technology", Jan. 1, 1993-Dec. 31, 1993; Center for Mfg. Systems, \$11,400, "Modeling and Control of Discrete Event Systems", July 1, 1992-June 30, 1993.
18. **R. Kumar (PI)**, \$42,000, Univ. of KY, "New Faculty Start-up Fund", August 1991.
19. **R. Kumar (PI)**, \$3,300, Univ. of KY Travel Support, "1998 Workshop on Discrete Event Systems, Italy", \$750, August 1998; "1993 IEEE Conf. on Decision & Control, San Antonio", \$550, Dec. 1993; "1993 American Control Conf., San Francisco", \$1,200, June 1993; "1991 IEEE Conf. on Decision and Control, England", \$800, Dec. 1991.

PATENTS (* denotes student, + denotes collaborator)

1. M. Pathak and **R. Kumar**, "Universally Optimal Power Management Methods and its Circuit Implementation for a Class of Motion Energy Harvesters", ISURF 05502, filed to ISU on 12/16/2022; Provisional Patent Application 63/490,663 filed on 03/16/2023.
2. B. Kashyap and **R. Kumar**, "Portable Multi-set differential pulse voltammetry for improved precision, mobility, and cost of electrochemical sensing", ISURF 05493, filed to ISU on 11/26/2022.
3. A. Bhar and **R. Kumar**, "MISSION: Model-predictive In-Season Scheduling of Irrigation Or/and Nitrogen", ISURF 05455, filed to ISU on 07/06/2022.
4. A. Al-Ghazo and **R. Kumar**, "Cybersecurity Algorithms and Tools for Supervisory Control and Data Acquisition and Industrial Control Systems", ISURF 05092, filed to ISU on 03/13/2020; Provisional Patent Application 63/007,173 filed on 04/08/2020.
5. H. Ren* and **R. Kumar**, "ReLIC: Reduced Logic Inference for Composition for Quantifier Elimination based Compositional Reasoning and Verification", ISURF 04762, filed to ISU on 3/15/2018, **Copyright protected, June 29, 2018.**
6. A. Ali⁺, S. Tabassum*, Q. Wang⁺, **R. Kumar**, and L. Dong⁺, "[Integrated Dual-Modality Microfluidic Sensor for Biomarker Detection](#)", ISURF 04729, filed to ISU on 12/14/2017; Provisional Patent Application 62/620,025, filed on 1/22/2018, **U.S. Patent No. 11,022,610, June 1, 2021**
7. S. Tabassum*, L. Dong and **R. Kumar**, "[Nano-patterning Methods Including: \(1\) Patterning of Nanophotonic Structures at Optical Fiber Tip For Refractive Index Sensing and \(2\) Plasmonic Crystal Incorporating Graphene Oxide Gas Sensor for Detection of Volatile Organic Compound](#)", ISURF 04453, filed on 12/17/2015; Provisional Patent Application 62/411,402, filed on 10/21/2016; Full Patent filed on 10/21/2017, **U.S. Patent No. 10,725,373, July 28, 2020.**
8. Z. Xu*, L. Dong⁺ and **R. Kumar**, "[Electrophoretic soil nutrient sensor for agriculture](#)", ISURF 04454, filed on 12/17/2015; Provisional Patent Application 62/411,315, filed on 10/21/2016; Full patent filed on 10/21/2017, **U.S. Patent No. 10,564,122, February 18, 2020.**
9. K. Singh*, **R. Kumar** and R. J. Weber⁺, "[Bistable Piezoelectric Cantilever Based Vibration Energy Harvester and Synchronized High-Power Extraction](#)", USPTO Application 62/145,012, Docket no. P11413US00, ISURF 04354, filed on 04/09/2015, **U.S. Patent No. 10,224,835 B1, March 5, 2019.**

10. G. Pandey*, **R. Kumar**, and R. J. Weber⁺, “[Low RF-Band Impedance Spectroscopy Based Sensor for In-situ, Wireless Soil Sensing](#)”, USPTO Application 14/695,763, Docket no. P11043US00, ISURF 04183, filed on 04/25/2014, **U.S. Patent No. 10,073,074, Sept. 11, 2018.**
11. **R. Kumar** and M. Li*, “Reduction of Automated Test Generation for Simulink/Stateflow to Reachability and its Novel Resolution”, ISURF 04226, provisional filed on 08/13/2014, **Copyright Protected, June 12, 2015.**
12. **R. Kumar** and M. Li*, “[Semantic Translation of Stateflow Diagrams Into Input/Output Extended Finite Automata And Automated Test Generation for Simulink/Stateflow Diagrams](#)”, **U.S. Patent No. 8,849,626 B1, Sept. 30, 2014**
13. **R. Kumar** and C. Zhou*, “[Semantic Translation of Time-Driven Simulink Diagrams Using Input/Output Extended Finite Automata](#)”, **U.S. Patent No. 8,655,636 B2, Feb. 18, 2014.**

PUBLICATIONS (* denotes student, + denotes collaborator)

A. Books

1. **R. Kumar** and V. K. Garg⁺. *Modeling and Control of Logical Discrete Event Systems*. Springer US. 1995

B. Journal Articles Published/Accepted (* denotes student, + denotes collaborator)

1. S. Takai⁺ and **R. Kumar**. “[Non-existence of Upper Bound to Inferencing Level in Decentralized Discrete Event Control](#)”. In: *IEEE Transactions on Automatic Control* (2024), pp. 1–8. DOI: [10.1109/TAC.2024.3410832](#)
2. R. Adesunkanmi and **R. Kumar**. “[Expectation Distance-Based Distributional Clustering for Noise-Robustness](#)”. In: *IEEE Transactions on Knowledge and Data Engineering* (2024), pp. 1–12. DOI: [10.1109/TKDE.2024.3386401](#)
3. A. T. AL Ghazo and **R. Kumar**. “[ANDVI: Automated Network Device and Vulnerability Identification in SCADA/ICS by Passive Monitoring](#)”. In: *IEEE Transactions on Systems, Man, and Cybernetics: Systems* 54.4 (2024), pp. 2539–2550. DOI: [10.1109/TSMC.2023.3345254](#)
4. S. Kundu*, S. Tabassum*, R. A. Kumar, E. D. Abel, and **R. Kumar**. “[Plasmonic Optical Fiber Based Continuous in-Vivo Glucose Monitoring for ICU/CCU Setup](#)”. In: *IEEE Transactions on NanoBioscience* 23.1 (2024), pp. 157–166. DOI: [10.1109/TNB.2023.3303345](#)
5. R. R. Hossain* and **R. Kumar**. “[A Distributed-MPC Framework for Voltage Control Under Discrete Time-Wise Variable Generation/Load](#)”. In: *IEEE Transactions on Power Systems* 39.1 (2024), pp. 809–820. DOI: [10.1109/TPWRS.2023.3266763](#)
6. A. T. A. Ghazo* and **R. Kumar**. “[Critical Attacks Set Identification in Attack Graphs for Computer and SCADA/ICS Networks](#)”. In: *IEEE Transactions on Systems, Man, and Cybernetics: Systems* (2023). ISSN: 2168-2232. DOI: [10.1109/TSMC.2023.3274613](#)
7. S. Talukder* and **R. Kumar**. “[Robust Stability of Neural-Network-Controlled Nonlinear Systems With Parametric Variability](#)”. In: *IEEE Transactions on Systems, Man, and Cybernetics: Systems* (2023). ISSN: 2168-2232. DOI: [10.1109/TSMC.2023.3257269](#)
8. R. R. Hossain*, R. Adesunkanmi, and **R. Kumar**. “[Data-Driven Linear Koopman Embedding for Networked Systems: Model-Predictive Grid Control](#)”. In: *IEEE Systems Journal* (2023). DOI: [10.1109/JSYST.2023.3253041](#)
9. R. R. Hossain* and **R. Kumar**. “[Machine Learning Accelerated Real-Time Model Predictive Control for Power Systems](#)”. In: *IEEE/CAA Journal of Automatica Sinica* 10.4 (2023), pp. 916–930. DOI: [10.1109/JAS.2023.123135](#)
10. J. Chen* and **R. Kumar**. “[Stochastic Failure Prognosis of Discrete Event Systems](#)”. In: *IEEE Transactions on Automatic Control* 67.10 (Oct. 2022), pp. 5487–5492. ISSN: 1558-2523. DOI: [10.1109/TAC.2021.3118670](#)
11. B. Kashyap* and **R. Kumar**. “[A novel multi-set differential pulse voltammetry technique for improving precision in electrochemical sensing](#)”. In: *Biosensors and Bioelectronics* (2022). DOI: [10.1016/j.bios.2022.114628](#)
12. M. Pathak* and **R. Kumar**. “[Synchronous Pre-biasing of Triboelectric Nanogenerator for Enhanced Energy Extraction](#)”. In: *IEEE Transactions on Power Electronics* (2022), pp. 1–1. ISSN: 1941-0107. DOI: [10.1109/TPEL.2022.3169733](#)

13. M. Pathak*, S. Xie*, C. Huang⁺, and **R. Kumar**. "High-Voltage Triboelectric Energy Harvesting Using Multi-Shot Energy Extraction in 70-V BCD Process". In: *IEEE Transactions on Circuits and Systems II: Express Briefs* 69.5 (May 2022), pp. 2513–2517. ISSN: 1558-3791. DOI: [10.1109/TCSII.2022.3160676](https://doi.org/10.1109/TCSII.2022.3160676)
14. **R. Kumar**, R. R. Hossain*, S. Talukder*, A. Jena*, and A. T. A. Ghazo*. "Recursive Histogram Tracking-Based Rapid Online Anomaly Detection in Cyber-Physical Systems". In: *IEEE Transactions on Systems, Man, and Cybernetics: Systems* (2022), pp. 1–11. ISSN: 2168-2232. DOI: [10.1109/TSMC.2022.3150304](https://doi.org/10.1109/TSMC.2022.3150304)
15. M. Pathak* and **R. Kumar**. "Self-propelled Pre-biased Synchronous Charge Extraction Circuit for Triboelectric Nanogenerator". In: *IEEE Journal of Emerging and Selected Topics in Power Electronics* (2022), pp. 1–1. ISSN: 2168-6785. DOI: [10.1109/JESTPE.2022.3158347](https://doi.org/10.1109/JESTPE.2022.3158347)
16. B. Kashyap* and **R. Kumar**. "A Plug-and-Play Type Field-Deployable Bio-Agent-Free Salicylic Acid Sensing System". In: *IEEE Sensors Journal* 21.21 (Nov. 2021), pp. 24820–24828. DOI: [10.1109/jsen.2021.3113303](https://doi.org/10.1109/jsen.2021.3113303)
17. S. Tabassum*, D. P. Kumar⁺, and **R. Kumar**. "Copper Complex-Coated Nanopatterned Fiber-Tip Guided Mode Resonance Device for Selective Detection of Ethylene". In: *IEEE Sensors Journal* 21.16 (Aug. 2021), pp. 17420–17429. DOI: [10.1109/jsen.2021.3057619](https://doi.org/10.1109/jsen.2021.3057619)
18. M. Pathak* and **R. Kumar**. "Synchronous Inductor Switched Energy Extraction Circuits for Triboelectric Nanogenerator". In: *IEEE Access* 9 (2021), pp. 76938–76954. DOI: [10.1109/access.2021.3082499](https://doi.org/10.1109/access.2021.3082499)
19. S. Kundu*, S. Tabassum*, and **R. Kumar**. "Plasmonic Point-of-Care Device for Sepsis Biomarker Detection". In: *IEEE Sensors Journal* 21.17 (Sept. 2021), pp. 18837–18846. DOI: [10.1109/jsen.2021.3088117](https://doi.org/10.1109/jsen.2021.3088117)
20. S. Basu⁺ and **R. Kumar**. "Control of Non-Deterministic Systems With μ -Calculus Specifications Using Quotienting". In: *IEEE/CAA Journal of Automatica Sinica* 8.5 (May 2021), pp. 953–970. DOI: [10.1109/jas.2021.1003964](https://doi.org/10.1109/jas.2021.1003964)
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199. **R. Kumar** and M. Shayman⁺. "Non-blocking supervisory control of nondeterministic discrete event systems". In: *Proceedings of 1994 American Control Conference - ACC '94*. Vol. 1. IEEE, June 1994, 1089–1093 vol.1. DOI: [10.1109/ACC.1994.751915](https://doi.org/10.1109/ACC.1994.751915)
200. M. A. Shayman⁺ and **R. Kumar**. "A New Approach to Supervisory Control". *1994 Annual Allerton Conference on Communication, Control, and Computing*, pages 861-870, Urbana, IL, September 1994.
201. **R. Kumar** and V. K. Garg⁺. "Formula for Supremal ω -Controllable Languages". *1994 Annual Allerton Conference on Communication, Control, and Computing*, pages 900-901, Urbana, IL, September 1994.
202. **R. Kumar** and M. A. Shayman⁺. "Non-blocking Control of Nondeterministic Systems". *1993 Annual Allerton Conference*, pages 707-716, Urbana, IL, October 1993.
203. M. A. Shayman⁺ and **R. Kumar**. "Supervisory Control of Nondeterministic Systems". *1993 Conference on Information Sciences and Systems*, pages 587-592, Johns Hopkins University, Baltimore, MD, March 1993.

204. M. Shayman⁺ and **R. Kumar**. "Supervisory control of nondeterministic discrete event dynamical systems". In: *Proceedings of 32nd IEEE Conference on Decision and Control*. IEEE, Dec. 1993, 1188–1193 vol.2. DOI: [10.1109/CDC.1993.325370](https://doi.org/10.1109/CDC.1993.325370)
205. **R. Kumar**. "Formulas for observability of discrete event dynamical systems". In: *Proc. 1993 Conf. Inf. Sci. Syst.* (1993), pp. 581–586
206. **R. Kumar**, V. K. Garg⁺, and S. I. Marcus⁺. "Logical Design of a Dispatching Unit". In: *1993 American Control Conference*. IEEE, June 1993. DOI: [10.23919/acc.1993.4793058](https://doi.org/10.23919/acc.1993.4793058)
207. **R. Kumar** and L. Holloway⁺. "Supervisory control of Petri net languages". In: *[1992] Proceedings of the 31st IEEE Conference on Decision and Control*. IEEE, Dec. 1992, 1190–1195 vol.1. DOI: [10.1109/CDC.1992.371529](https://doi.org/10.1109/CDC.1992.371529)
208. V. K. Garg⁺ and **R. Kumar**. "A State-Variable Approach for Controlling Discrete Event Systems with Infinite States". In: *1992 American Control Conference*. IEEE, June 1992. DOI: [10.23919/acc.1992.4792655](https://doi.org/10.23919/acc.1992.4792655)
209. **R. Kumar**, V. Garg⁺, and S. Marcus⁺. "Using predicate transformers for supervisory control". In: *[1991] Proceedings of the 30th IEEE Conference on Decision and Control*. IEEE, Dec. 1991, 98–103 vol.1. DOI: [10.1109/CDC.1991.261263](https://doi.org/10.1109/CDC.1991.261263)
210. **R. Kumar**. "Optimal Control of Discrete Event Dynamical Systems Using Network Flow Techniques". In: *Proc. 29th Annual Allerton Conf. on Communication, Control and Computing* (1991), pp. 705–714
211. **R. Kumar**, V. Garg⁺, and S. I. Marcus⁺. "On ω -controllability and ω -normality of ded's". In: *1991 American Control Conference*. IEEE, June 1991. DOI: [10.23919/acc.1991.4791935](https://doi.org/10.23919/acc.1991.4791935)
212. **R. Kumar**, V. Garg⁺, and S. Marcus⁺. "Stability of Discrete Event System Behavior". In: *IFAC Proceedings Volumes 24.5* (1991). IFAC Symposium on Distributed Intelligence Systems, Arlington, VA, USA, 13-15 August 1991, pp. 17–22. ISSN: 1474-6670. DOI: [10.1016/S1474-6670\(17\)51217-3](https://doi.org/10.1016/S1474-6670(17)51217-3)
213. **R. Kumar**, V. Garg⁺, and S. Marcus⁺. "Supervisory control of discrete event systems: supremal controllable and observable languages". In: *Proceedings of 1989 Allerton Conference*. Vol. 501510. 1989

D. Refereed Book Articles Published (* denotes student, + denotes collaborator)

1. M. Ibrahim⁺, J. Chen^{*}, and **R. Kumar**. "Quantification of Centralized/Distributed Secrecy in Stochastic Discrete Event Systems". In: *Recent Advances in Systems Safety and Security*. Ed. by E. Pricop and G. Stamatescu. Cham: Springer International Publishing, 2016, pp. 21–40. ISBN: 978-3-319-32525-5. DOI: [10.1007/978-3-319-32525-5_2](https://doi.org/10.1007/978-3-319-32525-5_2)
2. H. S. Sahota^{*}, **R. Kumar**, and A. E. Kamal⁺. "Network Design and Performance Evaluation of Wireless Sensor Network for Precision Agriculture". In: *Advances in Wireless Technologies and Telecommunication*. IGI Global, pp. 56–82. DOI: [10.4018/978-1-4666-8251-1.ch003](https://doi.org/10.4018/978-1-4666-8251-1.ch003)
3. S. Takai⁺ and **R. Kumar**. "Inference-Based and Modular Decentralized Control of Manufacturing Systems with Event-Driven Dynamics". In: *Formal Methods in Manufacturing*. CRC Press, 2018, pp. 315–342
4. T. Fuhrman⁺, M. Osella⁺ and S. Jiang⁺ (GM); W. Milam⁺ and D. Watson⁺ (Ford); R. Hormel⁺ (Chrysler); P. Koopman⁺ and J. Black⁺ (CMU); B. Williams⁺, P. Robertson⁺ and C. Wilcox⁺ (MIT); R. Kumar and C. Zhou (ISU); "Fault Tolerant Embedded Software", Final Report of USCAR Electrical Architecture Task Force, Jan. 2010.
5. J. McCalley⁺, **R. Kumar**, V. Ajjarapu⁺, O. Volij, H. Liu^{*}, L. Jin^{*}, and W. Shang. "Models for Transmission Expansion Planning Based on Reconfigurable Capacitor Switching". English. In: *Economic Market Design and Planning for Electric Power Systems*. United States: John Wiley & Sons Inc., Dec. 2009, pp. 181–236. ISBN: 9780470472088. DOI: [10.1002/9780470529164.ch9](https://doi.org/10.1002/9780470529164.ch9)
6. A. Arapostathis⁺, **R. Kumar**, and S. Tangirala. "Safety Control of Completely Observed Markov Chains". In: *Discrete Event Systems: Analysis and Control*. Ed. by R. Boel and G. Stremersch. Boston, MA: Springer US, 2000, pp. 421–428. ISBN: 978-1-4615-4493-7. DOI: [10.1007/978-1-4615-4493-7_44](https://doi.org/10.1007/978-1-4615-4493-7_44)
7. **R. Kumar** and V. K. Garg⁺. "Control of Stochastic Discrete Event Systems: Existence". In: *1998 International Workshop on Discrete Event Systems*. Aug. 1998, pp. 24–29

8. **R. Kumar** and M. A. Shayman⁺. “Supervisory control of real-time systems using prioritized synchronization”. In: *Hybrid Systems III*. ed. by R. Alur, T. A. Henzinger, and E. D. Sontag. Berlin, Heidelberg: Springer Berlin Heidelberg, 1996, pp. 350–361. ISBN: 978-3-540-68334-6. DOI: [10.1007/BFb0020959](https://doi.org/10.1007/BFb0020959)
9. R. Kumar, S. Nelvagal*, and S. I. Marcus⁺. “Design of Protocol Conversion: A Discrete Event Systems Approach”. *1996 International Workshop on Discrete Event Systems*, pages 7-12, Edinburgh, UK, August 1996.
10. R. Kumar and Haomin Li*. “Optimizing Assembly Time for PCB Assembly”. In H. R. Pasaei and T. R. Hanley, editors. *Manufacturing Decision and Support Systems*, Chapter 11, Chapman and Hall, 1996.
11. **R. Kumar** and M. A. Shayman⁺. “Avoiding blocking in prioritized synchronization based control of nondeterministic systems”. In: *11th International Conference on Analysis and Optimization of Nondiscrete Event Systems*. Ed. by G. Cohen and J.-P. Quadrat. Berlin, Heidelberg: Springer Berlin Heidelberg, 1994, pp. 49–58. ISBN: 978-3-540-39345-0. DOI: [10.1007/BFb0033531](https://doi.org/10.1007/BFb0033531)
12. **R. Kumar**, V. K. Garg⁺, and S. I. Marcus⁺. *Stable Behavior and Stabilizing Supervisor for Discrete Event Dynamical Systems*. Tech. rep. 1991

E. Thesis and Dissertation

1. “Supervisory Synthesis Techniques for Discrete Event Dynamical Systems”. Ph.D. Dissertation, University of Texas at Austin, August 1991.
2. “Robotics Arm Control Using 68000 Microprocessor System”. Bachelors Project Report, Department of Electrical Engineering, Indian Institute of Technology Kanpur, India, April 1987 (with R. Guruprasadh).

F. Journal/Book Articles Submitted (* denotes student, + denotes collaborator)

1. H. Ren*, M. Clarke⁺, and R. Kumar, “ReLIC: Reduced Logic Inference for Composition for Quantifier Elimination based Compositional Reasoning and Verification, *IEEE Transactions on Systems, Man and Cybernetics: Systems*, submitted (Oct. 2020).
2. R. Hossain* and R. Kumar, “Trajectory Sensitivity Computation for Power Systems and MPC-based Coordinated Voltage Stabilization”, *IEEE Transactions on Systems, Man and Cybernetics: Systems*, submitted (June 2020).
3. A. Al Ghazo* and R. Kumar, “ANDVI: Automated Network Device and Vulnerability Identification in SCADA/ICS by Passive Monitoring”, *IEEE Transactions on Systems, Man and Cybernetics: Systems*, submitted (Nov. 2019).
4. A. Al Ghazo* and R. Kumar, “Critical-Attacks Set Identification in Attack-Graphs for Computer and SCADA Networks”, *IEEE Transactions on Systems, Man and Cybernetics: Systems*, submitted (Sept. 2019).
5. R. Kumar and S. Takai⁺, “Control-Reconfiguration Following Fault-Detection in Supervisory Control of Discrete Event Systems”, *Journal of Discrete Event Dynamical Systems*, submitted (May 2017).
6. C. Zhou⁺ and R. Kumar, “Bisimilarity Enforcement for Discrete Event Systems Using Deterministic Control: Extension to Decentralized Setting”, *IEEE Transactions on Automation Science and Engineering*, submitted (May 2016).
7. S. Xu*, J. Chen* and R. Kumar, “Distributed and Asynchronous State Estimation under Arbitrary Delays for Discrete Event Systems”, *IEEE Transactions on Automation Science and Engineering*, submitted (May 2015).
8. S. Xu* and R. Kumar, “Control of Event Driven Systems under Nondeterministic Observations”, *IEEE Transactions on Automation Science and Engineering*, submitted (May 2015).
9. Z. Huang*, S. Bhattacharyya*, R. Kumar*, S. Jiang*, and V. Chandra*, “Diagnosis of Discrete-Event Systems in Rules-based Model using First-order Linear Temporal Logic”, *Asia Journal of Control*, submitted (June 2010).
10. S. Mitra*, R. Kumar, and S. Basu⁺, “Choreography-based Service Composition using Input / Output Automata”, *IEEE Transactions on Automatic Control*, submitted (Jan. 2010).

GRADUATE STUDENTS SUPERVISED: 71 Total ; 58 Completed; (6 PostDoc, 28 PhD, 24 MS); 10 PhD and 3 Masters under supervision

A. PhD/PostDoc Students (43 Total; 28 PhD and 6 PostDoc completed; 9 PhD under Supervision)

1. [Dr. Madhav Pathak](#), PostDoc, Spring-Summer 2023. (Joined IIT Kanpur, Uttar Pradesh, India)
2. [Dr. Shawana Tabassum](#), PostDoc, started Dec. 2018. (Joined Univ. of Texas, Tyler, TX)
3. [Dr. Gunjan Pandey](#), PostDoc, Spring 2014. (Joined Skyworks, Cedar Rapids, IA.)
4. [Dr. Lucien Ouedraogo](#), PostDoc, Fall 2009-Spring 2012. (Joined MathWorks, Boston, MA.)
5. [Dr. Jing Huang](#), PostDoc, Feb. 2009-August 2010. (Joined NSX, Austin, TX.)
6. [Dr. Changyan Zhou](#), PostDoc, Jan. 2008-Oct. 2008. (Joined Magnatech Inc., Hartford, CT.)
7. [Debatirtha Deb](#), started Summer 2024 (Smart Grid)
8. [Jabir S. Karachiwala](#), started Summer 2024 (NLP and Formal Methods in Smart Contracts)
9. [Hsin-Che Wu](#), started Spring 2024 (Energy Harvesting and IoT Circuits and Fabrication)
10. [Salma Sultana](#), started Fall 2023 (Precision livestock & Whole Farm Modeling; Biosensing for Antimicrobial Resistance)
11. [Aditya Sengupta](#), started Fall 2022 (Optical Gas Sensing)
12. [Sanghyoup Gu](#), started Summer 2021 (Autonomy with vision-based control)
13. [Balaji S Pokuri](#), started Spring 2021 (Agricultural modeling)
14. [Gang Wu](#), Started Fall 2011 (Video Analytics based on Matrix Completion methods)
15. [Rahmat Adesunkanmi](#), started Fall 2020 (Machine learning algorithms)
16. [Srijita Patra](#), "Systems for electromigration study under frequency effect and non-uniform thermal effect: design, fabrication, and testing", Nov. 2024, ECE, Iowa State Univ. (works for Intel)
17. [Ramij Hossain](#), "Advanced Model Predictive Control Techniques in Real-time Operations and Control of Power Systems", Nov. 2023, ECE, Iowa State University. (Joined PNNL)
18. [Souvik Kundu](#), "Opto-chemical biosensor development, and analytics for point-of-care applications", July 2023, ECE, Iowa State University. (Joined Intel)
19. [Soumyabrata Talukder](#), "Robust safety and stability of learning-based optimal controllers", July 2023, ECE, Iowa State University. (Joined Eaton Inc.)
20. [Madhav Pathak](#), "Synchronous switched circuits for enhanced energy extraction from triboelectric kinetic energy harvesters", Oct. 2022, ECE, Iowa State University. (Joined PostDoc, ISU, now Faculty at IIT Gandhinagar)
21. [Bhuwan Kashyap](#), "Sensing for Sustainable Agriculture with focus on developing technologies for monitoring Plant stress", June 2021, ECE, Iowa State University. (Joined Skyworks, Inc.)
22. [Anupam Bhar](#), "Towards sustainable Food-Energy-Water security nexus of farms: Use of Agriculture Model for Precision Decision Making", March 2021, ECE, Iowa State University. (Joined Center for Survey and Statistical Methods, Iowa State University)
23. [Alaa Al-Ghazo](#), "A Framework for Cybersecurity of Supervisory Control and Data Acquisition (SCADA) Systems and Industrial Control Systems (ICS)", Nov. 2019, ECE, Iowa State University. (Joined Faculty at University of Hartford.)
24. [Shawana Tabassum](#), "Nano-structured Optical Sensors Fabrication and Validation for Gas Sensing", Nov. 2018, ECE, Iowa State University. (Joined Faculty at Univ. of Texas, Tyler)
25. [Zhen Xu](#), "High-throughput microfluidic assay devices for culturing of soybean and microalgae and microfluidic electrophoretic ion nutrient sensor", April 2018, ECE, Iowa State University. (Joined Bright Garden Robotics, a subsidiary of Country Garden, China.)
26. [Hao Ren](#), "Model-based compositional verification for cyber-physical systems: approaches and tools development", March 2018, ECE, Iowa State University. ISU Research Excellence Award. (Joined Honeywell Aerospace, Advanced Technology Division.)
27. [Mariam Ibrahim](#), "Metrics for Secrecy and Resiliency in Cyber-Physical-Systems", June 2016, ECE, Iowa State University. (Joined German Jordanian University as Asst. Prof.)

28. [Kanishka A. Singh](#), "A broadband bistable piezoelectric cantilever-based vibration energy harvester with nonlinear high power extraction", Dec. 2015, ECE, Iowa State University. (Joined NextEra Energy, Inc.)
29. [Jun Chen](#), "Failure Diagnosis and Prognosis in Stochastic Discrete-Event and Cyber-Physical Systems", August 2014, ECE, Iowa State University. (Joined Idaho National Laboratory, Idaho Falls, ID.)
30. [Gunjan Pandey](#), "Development of impedance spectroscopy based in-situ, self-calibrating, on-board sensor with in-built metamaterial inspired small antenna for ionic detection in multi-phase mixtures like soil", Feb. 2014, ECE, Iowa State University. (Joined Skyworks, Cedar Rapids, IA.)
31. [Meng Li](#), "A Model-based approach to Automated Test Generation and Error Localization for Simulink/Stateflow", Nov. 2013, ECE, Iowa State University. (Joined GE Research, Schenectady, NY.)
32. [Herman Sahota](#), "Wireless sensor network for precision agriculture: Design, Performance Modeling and Evaluation, and Node Localization", July 2013, ECE, Iowa State University. (Joined IBM, San Jose, CA.)
33. [Songyan Xu](#), "Control and diagnosis of real-time systems under finite-precision measurement of time", Nov. 2010, ECE, Iowa State Univ. (Joined Rockwell Collins, Cedar Rapids, IA.)
34. [Wen Qin](#), "Fault-Tolerant Control of Discrete-Event Systems", March 2009, ECE, Iowa State Univ. (Joined Statistics & Controls, Des Moines, IA.)
35. [Licheng Jin](#), "Reachability and Model-Prediction Based Power System Protection Schemes", March 2009, ECE, Iowa State Univ. (Joined California ISO, Sacramento, CA.)
36. [Jing Huang](#), "Directed Control of Discrete-Event Systems", Feb. 2009, ECE, Iowa State Univ. (Joined Virginia Tech as PostDoc.; now with Freescale, Austin, TX.)
37. [Saayan Mitra](#), "I/O-Automata based formal approach to Web Services Choreography", Jan. 2009, ECE, Iowa State Univ. (Joined Adobe, San Jose, CA.)
38. [Changyan Zhou](#), "Control for Discrete Event Systems for Bisimulation and Simulation Equivalence Specification", May 2006, ECE, Iowa State Univ. (Joined UIUC, Industrial and Systems Eng., Urbana-Champaign as Visiting Prof.; now with Magnatech Inc.)
39. [Siddhartha Bhattacharyya](#), "Hierarchical Hybrid-Model Based Design, Verification, Simulation, and Synthesis of Mission Control for Autonomous Underwater Vehicles", July 2005, ECE, Univ. of KY. (Joined Kentucky State University, Computer and Technical Sciences Dept., Frankfort, KY as Asst. Prof.; now with Rockwell Collins, Cedar Rapids, IA.)
40. [Wenbin Qiu](#), "Decentralized/distributed failure diagnosis and supervisory control of discrete event systems", May 2005, ECE, Iowa State Univ. (Joined Corning, Inc., Corning, NY.)
41. [Jeff Ashley](#), "Diagnosis of Condition Systems". February 2004, ECE, Univ. of KY. (Joined Univ. of Kentucky, ECE Dept. Lexington, KY.)
42. [Zhongdong Huang](#), "Rules based Modeling of Discrete Event Systems with Faults and their Diagnosis". August 2003, ECE, Univ. of KY. (Joined LHP Software, Indianapolis, IN.)
43. [Vigyan Chandra](#), "New Modeling and Interaction Formalism for Discrete Event Systems and their Control". April 2002, ECE Univ. of KY. (Joined Eastern Kentucky University, Technology Dept., Richmond, KY.)
44. [Shengbing Jiang](#), "Control and Diagnosis of Discrete Event Systems with Temporal Logic Specifications". April 2002, ECE, Univ. of KY. (Joined GM R&D, Warren, MI.)

B. Master Students (28 Total; 24 completed, 4 under Supervision)

1. [Sam D. Burns](#), started Fall 2024.
2. [Meghana Korada](#), started Fall 2024.
3. [Christopher Pedersen](#), started Fall 2020.
4. [Souvik Kundu](#), April 2019, ECE, ISU (Continued as PhD in ECE, ISU.)
5. [Shawana Tabassum](#), June 2018, ECE, ISU. (Continued as PhD student in ECE, ISU.)
6. [Lucas Wagner](#), "A Compositional Reasoning Framework for Imperative Programs", April 2017, ECE, ISU. (works at Rockwell Collins.)

7. [Karen \(Kim\) Wang](#), "A Soil Sensor Graphical User Interface", Dec. 2014, ECE, Iowa State Univ. (works at Employers in Reno, NV.)
8. [Daniel Humke](#), "Analysis of multivariable controller designs for diesel engine air system control", May 2013, ECE, Iowa State Univ. (joined John Deere, Waterloo, IA.)
9. [Matthew Jeschke](#), "Modern Embedded Systems Design: Survey of Tools, Techniques, and Current Practices" Fall 2007, ECE, Iowa State Univ. (joined Boston Scientific, Minneapolis, MN.)
10. [Gregory P. Stamp](#), "Software for Discrete Event Systems", Fall 2006, ECE, Iowa State Univ. (joined Boston Scientific, Minneapolis, MN.)
11. [Joshua M. Olson](#), "Modeling of a Discrete-Event Manufacturing Plant and Design and Implementation of Controller using LabView and Programmable Logic Controllers", April 2005, ECE, Iowa State Univ. (joined Raytheon, Tucson, AZ.)
12. [Vigyan Chandra](#), "Automated Extraction of a Controller from a Supervisor in Discrete Event Systems", August 2003, Mfg., Univ. of KY. (joined Eastern Kentucky Univ., Richmond, KY.)
13. [Zhen Yu](#), "Enhancements of CINET Fuzzy Classifier". April 2003, ECE, Iowa State Univ. (joined Ericsson, San Jose, CA.)
14. [Siddhartha Bhattacharyya](#), "Discrete Event System Approach to Network Fault Management". April 2003, ECE, Iowa State Univ. (joined KY State University, currently at Rockwell Collins, Cedar Rapids, IA.)
15. [Zhongdong Huang](#), "Coal Segregation Control: Meeting Homogeneity Standards". July 2002, ECE, Univ. of KY. (currently with LHP Software, Indianapolis, IN.)
16. [Satya R. Mohanty](#), "On the Design of Controllers for Discrete Event Systems: An Optimization Based Theory". January 1999, ECE, Univ. of KY. (joined Nokia.)
17. [Siva Gopala Namburi](#), "Design and Analysis of Multiprotocol Converter for Multiple Flow Control Protocols: A Discrete Event Systems Approach", December 1998, ECE, Univ. of KY. (joined Array Networks, Milpitas, CA.)
18. [Bharath Orunganti](#), "A Graphical User Interface for Discrete Event Control Algorithms and their Applications". October 1997, ECE, Univ. of KY. (joined Cadence Design Systems.)
19. [Vigyan Chandra](#), "Design, Discrete Event Modeling & Control of a Miniature LEGO Assembly Line". October 1997, ECE, Univ. of KY. (joined Eastern Kentucky University as Faculty.)
20. [Manoz G. Krovvidy](#), "Timed Automaton based Successive Refinement of Digital Circuit Design for Hardware Synthesis". October 1996, ECE, Univ. of KY. (at Nvidia, Hyderabad.)
21. [Zhonghui Luo](#), "Load Side Electrical Demand Control". December 1995, ECE, Univ. of KY.
22. [Sudhir Nelvagal](#), "Design of Protocol Converters: A Discrete Event Systems Approach". July 1995, ECE, Univ. of KY. (at GE Healthcare.)
23. [Wai Kit Leong](#), "Autoplacement and Autorouting in Printed Circuit Layout". June 1995, ECE, Univ. of KY.
24. [Steve Harris](#), "Temperature Control in Laser Printers". April 1995, ECE, Univ. of KY. (at Lexmark, Lexington, KY.)
25. Ravichander Sekar, "Stability and Tolerance in Discrete Event Systems". September 1994, ECE, Univ. of KY.
26. [Hok M. Cheung](#), "Control of Discrete Event Systems Using Limited Lookahead Based on Estimation". December 1993, ECE, Univ. of KY.
27. [Haomin Li](#), "Optimal Sequencing for Pick-and-Place Robots". September 1993, ECE, Univ. of KY. (joined Lexmark, Lexington, KY.)

INVITED TALKS AND SERVICES

1. INVITED TALKS

- Indian Institute of Technology, Kanpur, NY Karvaan, Oct. 2024
- Ohio State University, Oct. 2023
- Indian Institute of Technology, Kanpur, Dec. 2022
- Rutgers University, Oct. 2022
- International Conference on Contemporary Computing, Invited Lecture, Aug. 2019
- IEEE Rockville Section, IEEE CSS Distinguished Lecture, Nov. 29, 2018
- Honeywell Aerospace, Minneapolis, MN, Oct. 19, 2018

NXP Semiconductors, Austin, TX, Aug. 16, 2018
 Univ. of Melbourne, IEEE CSS Distinguished Lecture, Aug, 17, 2017
 Univ. of New South Wales, CSE, IEEE CSS Distinguished Lecture, Aug, 15, 2017
 IEEE Orlando Chapter, IEEE Controls Systems Society Distinguished Lecture, Oct. 31, 2016
 Univ. of Maryland, Dept. of Elec. & Comp. Eng., Oct. 28, 2016
 IEEE Washington Chapter, IEEE Controls Systems Society Distinguished Lecture, Oct. 28, 2016
 Dept. of Computer Science, Indiana University—Purdue University, Indianapolis, TBD
 Safe and Secure Systems and Software Symposium (S5), Jun. 10, 2015
 IDTech Energy, Harvesting and Storage, Santa Clara, Nov. 19, 2015
 Air Force Research Lab, Dayton OH, Nov. 12, 2015
 IEEE International Conference on Systems, Man and Cybernetics, Oct. 2014
 Plenary at Int. Conf. on Inf. Tech., Bhuwaneshwar, India 2014
 IEEE Conference on Systems, Man and Cybernetics, San Diego, Oct. 2014
 Airforce Research Rome Lab, Rome, NY, Jun. 2014
 General Electric Research, Schenectady, NY, Jun. 2014
 Plenary at IEEE International Workshop on Discrete Event Systems, Paris, May 2014
 Department of Electrical & Computer Engineering, Clemson University, May 2014
 IEEE International Conference on Networking, Sensing and Controls, Miami, FL, Apr. 2014
 Dept. of Electrical & Computer Engineering, University of Florida, Gainesville, FL, Mar. 2014
 IEEE Conference on Automation Science and Engineering, Milwaukee, Aug. 2013
 IEEE Multiconference on Systems and Controls, Hyderabad, Aug. 2013
 IEEE International Conference on Systems, Man and Cybernetics, Manchester, UK Oct. 2013
 IFAC Symp. Fault Detection, Supervision & Safety of Tech. Processes, Mexico City, Aug. 2012
 Jonh Deere, Model-based Software Development Group, Apr. 2011
 General Motors R & D, Diagnosis & Prognosis Group, Warren, MI, Mar. 2011
 AUTO-Cyberphysical Systems, Detroit, MI, Mar. 2011
 NSF-ECCS Grantees Workshop, Honolulu, HI, Dec. 2010
 Virginia Tech., Dept. of Elec. & Comp. Eng., Nov. 2009
 2009 IEEE Conf. on Automation Science and Engineering, Aug. 2009
 Advances in Discrete-Event, Nonlinear and Stochastic Systems Modeling and Control, Inst. of Systems Research, Univ. of Maryland, Apr. 2009
 Univ. of Texas at Austin, Dept. of Elec. & Comp. Eng., Sep. 2008
 Keynote at IEEE International Workshop on Software Cybernetics, Turku, Finland, 2008
 Multi-Conference on Systems and Control (Invited talk in “NSF GOALI session”), San Antonio, TX, Sep. 2008
 United Technologies Research Center, Hartford, Connecticut, Aug. 2008
 Keynote Speech at International Workshop on Software Cybernetics, Turku, Finland, Jul. 2008
 Dependable Control of Discrete Systems, Paris, Jun. 2007
 Iowa State University, Dept. of Elec. & Comp. Eng., Ames, Dec. 2006
 Rockwell Science Center, Cedar Rapids, IA, Jul. 2006
 Honeywell Technology Center, Minneapolis, MN, Jul. 2006
 Institute of Systems Research, Univ. of Maryland, College Park, Apr. 2006
 IEEE Conf. on Decision and Control, Seville, Spain, Dec. 2005
 IFAC World Congress, Prague, Chekeslovakia, Jul. 2005
 Application and Theory of Petri Nets (ATPN), Miami, FL, Jun. 2005
 Rockwell Collins, Cedar Rapids, Jul. 2004
 Rockwell Collins, Cedar Rapids, Sep. 2002
 Honeywell Technology Center, Minneapolis, May 2002
 Iowa State University, Dept. of Elec. & Comp. Eng., Ames, Mar. 2002
 Argonne National Lab.—West, Jul. 2001
 CWI, Amsterdam, Netherlands, May 2001
 Vanderbilt University, Dept. of Elec. Eng. & Comp. Sc., Mar. 2001
 Politecnico di Torino, Dept. di Automatica ed Infomatica, Turin, Italy, Aug. 2000
 Georgia Institute of Technology, Department of Electrical Eng., Atlanta, Oct. 1998
 Pennsylvania State University, Department of Electrical Eng., State College, Feb. 1998
 Applied Research Laboratory, State College, Jun. 1997
 University of California at Berkeley, Department of EECS, Berkeley, Jun. 1996

Institute of Industrial Engineers, Lexington Chapter, Apr. 1996
 University of Kentucky, Department of Computer Science, Apr. 1995, Nov. 1993
 University of Kentucky, Department of Mathematics, Fall 1991, Spring 1994
 University of Toronto, Department of Electrical Eng., Toronto, Jun. 1994
 University of Maryland at College Park, Systems Research Center, College Park, Jun. 1992, Sep. 1998
 Indian Institute of Sciences, Dept. of Computer Science and Automation, Bangalore, India, Dec. 1990, May 2001

2. **UNIVERSITY SERVICES**

VPR, Outstanding Research Evaluation Committee, Spring 2024
 College Budget Advisory Committee, Fall 2023-Present
 Program Coordinator, Joint PhD ISU-IITK, July 2022-Present
 Faculty Advisor, IEEE Student Chapter, ISU, 2019-Present
 ECE Awards Committee, ISU, 2019-Present
 Power Area Faculty Search Committee, ISU, 2022
 ECE Grad Committee, ISU, 2019-2021
 ECE representative on College Awards Committee, ISU, 2018-2021
 Chair, Dept. Seminar Committee, ISU, 2011-2018
 Chair, Data, Decisions, Networks and Autonomy, ECE, ISU, 2012-Present
 Search Committee, Decision Sciences area, 2016-17
 College Research Committee, 2014-Present
 ECE External Review Committee, 2014-2016
 ECE Diversity Committee, ISU, 2013-Present
 ECE Promotion & Tenure Committee, ISU, 2013-14
 ECE Senior Lecture Recruitment Committee, ISU, 2013-14
 College of Engineering Promotion & Tenure Committee, ISU, 2009-2012
 Cluster Hire Search Committee, ISU, 2007-2009
 Dept. Promotion & Tenure Committee, ISU, 2005-2007
 Dept. Faculty Search Committee, ISU, 2004-2005
 Dept. Curriculum Committee, ISU, 2005-2007
 Dept. Graduate Admissions Committee, ISU, 2004-05
 Coordinator, Dept. Governance Document revision, ISU, Summer 2003
 Member, PTRC document revision committee, ISU, Summer 2003
 Faculty Mentoring Committee for Prof. Berleant, ISU, 2002-2003
 Faculty Advisor, *India Student Association*, Univ. of KY, 1996, 1997, 2001
 Member, *Undergraduate Curriculum Review Group*, Dept. ECE, Univ. of KY, 2000-2002
 Leader, *Signals and Systems Group*, Dept. of ECE, Univ. of KY, 1999-2002
 Member, *Undergraduate Lab. Committee*, Dept. of Elec. Eng., Univ. of KY, 1999-2002
 Faculty Advisor, *Transfer Students*, Univ. of KY, Spring 1994
 Member Smoking Committee for EEAnnex Bldg, Univ. of KY, Fall 1993
 Faculty Advisor, *Co-op Students*, Univ. of KY, Spring 1993

3. **EDITORIAL AND OTHER PROFESSIONAL SERVICES**

Member *Public Arts Council*, City of Ames, 2024-Present
 Co-Advisor for PhD Student at Bits-Pilani, Hyderabad, 2024-Present
 Organizing Committee, *IITKarvaan*, Chicago, 2024
 Organizing Committee, *NSF CSSI PI Meeting*, 2024
 Program Committee, *PanIIT Bi-annual Meeting*, DC, Jan 2024
 Vice President, *Alumni Association IIT Kanpur*, 2021-2023
 Chair, *IEEE Central Iowa Section Technical Chapter on Controls*, 2016-Present
 Executive Committee, *IEEE Central Iowa Section*, 2016-Present
IEEE Fellow Committee for System, Man, and Cybernetics Society, 2017-Present.
IEEE Fellow Committee for Control System Society, 2009.
 Representative Delegate of IEEE Central Iowa Section at *IEEE Sections Congress*, Sydney, Australia, Aug. 2017
 Advisory Editorial Board Member, *IET Cyber-Physical Systems: Theory & Applications*, 2016-Present

Associate Editor, *Sensors—MDPI*, 2018-Present
 Associate Editor, *IEEE Transactions on Systems, Man and Cybernetics: Systems*, 2017-Present
 Associate Editor, *IET Cyber-Physical Systems: Theory & Applications*, 2016-Present
 Associate Editor, *ACM Transactions on Embedded Computing Systems*, 2014-2020
 Associate Editor, *Journal of Discrete Event Dynamical Systems*, 2005-2009
 Associate Editor, *SIAM Journal on Control and Optimization*, 1999-2007
 Associate Editor, *IEEE Transactions on Robotics and Automation*, 2000-2002
 Associate Editor, *International Journal of Discrete Event Control Systems*, 2009-2015
 Steering Committee, *Int. Workshop on Software Cybernetics* (concurrently with IEEE COMP-SAC), 2008-2015
 Program Co-Chair, *International Workshop on Software Cybernetics*, 2009
 General Co-Chair, *Int. Workshop on Discrete Event Systems*, 2008
 Program Committee, *IEEE Int. Conference on Industrial Cyber-Physical Systems*, 2018-2020
 Program Committee, *IEEE Int. Conference on Communication Systems and Networks*, 2016-2018
 Program Committee, *IEEE Int. Conference on Automation Science and Engineering*, 2013-2018
 Program Committee, *IEEE Systems, Man and Cybernetics*, 2015-2019
 Program Committee, *Analysis and Design of Hybrid Systems*, 2015-2020
 Program Committee, *IEEE Conference on Computer, Software and Applications*, 2014-2018
 Program Committee, *Int. Workshop on Discrete Control of Dependable Systems*, 2010-2018
 Program Committee, *International Workshop on Discrete Event Systems*, 1998-2019
 Program Committee, *IEEE International Symposium on Intelligent Control*, 1999
 Program Committee, *IEEE Conference on Decision and Control*, 1997, 1998, 2002, 2006
 Program Committee, *IEEE Int. Conference on Emerging Technologies and Factory Automation*, 2013.

4. SESSION/PANEL CHAIR/ORGANIZER/MEMBER

Panelist, NSF-CCSS, 2018
 Panelist, NSF-EPCN, 2017, 2022
 Panelist NSF-CAREER, NSF-CRCD, NSF-GOALI, NSF-CyberSEES
 Panelist, *Best Paper Award for 1993 IEEE Conference on Decision and Control*
 Member *Control Systems Delegation to the People's Republic of China*, 2000
 Invited session organizer, *2013 IEEE Multiconference on Systems and Controls*,
 Invited session organizer, *2009 International Workshop on Software Cybernetics* (held concurrently with IEEE COMPSAC),
 Invited session organizer, *2009 IEEE Conference on Automation Science and Engineering*,
 Invited session organizer, *2005 Joint IEEE Conference on Decision and Control and European Control Conference*
 Invited session organizer, *1999 IEEE International Symposium on Intelligent Control*
 Invited session organizer, *1998, 2008 International Workshop on Discrete Event Systems*
 Invited session organizer, *1996 Mathematical Theory of Networks and Systems*
 Session Chair, *2013 IEEE Multiconference on Systems and Controls*,
 Session Chair, *2007 Dependable Control of Discrete Systems*
 Session Chair, *1996, 1998, 2000, 2006, 2008 International Workshop on Discrete Event Systems*
 Session Chair, *1991, 1997, 1999, 2003, 2004, 2005, 2006, 2007 IEEE Conf. on Decision & Control*
 Session Chair, *1994, 1998, 2003, 2004, 2005, 2006, 2007, 2008 American Control Conference*
 Session Chair, *2000 NSF Workshop on Logic Control of Manufacturing Systems*
 Session Chair, *1992 SIAM Symposium on Control and its Application*