

# Indranil Saha, Ph.D.

---

## CONTACT

**INFORMATION** Dept. of Comp. Science and Engineering, RM 408 Phone: +91-512-259-6343 (Office)  
Indian Institute of Technology Kanpur Phone: +91-7080975312 (Mobile)  
Kalyanpur, Kanpur Email: isaha@cse.iitk.ac.in  
Uttar Pradesh 208016, India WWW: <http://www.cse.iitk.ac.in/~isaha>

## CURRENT POSITION

**Associate Professor**  
Department of Computer Science and Engineering  
Indian Institute of Technology Kanpur  
January 2020 – Present

## EDUCATION

**Ph.D.** in Computer Science, University of California Los Angeles  
June 2013  
**M.Tech.** in Computer Science, Indian Statistical Institute, Kolkata  
August 2005  
**B.Tech.** in Electronics and Communication Engineering, Kalyani Govt. Engg. College  
June 2003

## RESEARCH INTERESTS

Formal Methods  
Artificial Intelligence  
Embedded and Cyber-Physical Systems  
Robotics and Automation

## RESEARCH EXPERIENCE

**Assistant Professor** at the Department of Computer Science and Engineering, IIT Kanpur  
July 2015 – December 2019  
**Postdoctoral Researcher** at University of California Berkeley and University of Pennsylvania  
July 2013 – June 2015

- Advisors: Prof. Sanjit A. Seshia and Prof. George J. Pappas
- Member of ExCAPE project (<https://excape.cis.upenn.edu/>)
- Member of TerraSwarm project (<https://www.terraswarm.org/>)

**Research Assistant** at the Computer Science Department of University of California Los Angeles  
September 2008 – June 2013  
**Research Associate** at Computer Science laboratory of SRI International, Menlo Park, CA, USA  
June 2010 – September 2010, June 2011– September 2011, July 2012 – September 2012  
**Technical Consultant** at Toyota Technical Center, North America  
October 2010 – June 2012  
**Visiting Researcher** at Max Planck Institute for Software Systems (MPI-SWS)  
November 2010 – December 2010, April 2011 – June 2011, November 2011 – December 2011,  
May 2012 – June 2012, October 2012 – December 2012  
**Research Scientist** at Honeywell, Bangalore, India  
August 2005 – August 2008

## TEACHING EXPERIENCE

Department of Computer Science and Engineering, IIT Kanpur

January 2018 – April 2018

Instructor for *CS101: Introduction to Computing*

January 2017 – April 2017

Instructor for *CS220: Computer Organization*

July 2016 – November 2016, July 2018 – November 2018, July 2020 – November 2020

Instructor for *CS637: Embedded and Cyber-Physical Systems*

January 2016 – April 2016, January 2019 – April 2019, January 2020 – April 2020

Instructor for *CS638: Formal Methods for Robotics and Automation*

July 2017 – November 2017, July 2019 – November 2019

Instructor for *CS652: Computer Aided Verification*

Computer Science Department, University of California Los Angeles

January 2010 – June 2010

Teaching Assistant for *CS 130: Software Engineering*

- In Winter 2010 with Prof. Paul Eggert
- In Spring 2010 with Prof. Rupak Majumdar

Honeywell Research Lab, Bangalore

August 2005 – December 2005

Seminar series speaker for *Distributed Computing*

## AWARDS AND RECOGNITIONS

IIT Kanpur **P. K. Kelkar Faculty Fellowship** 2020-2023

UCLA **Dissertation Year Fellowship** 2012-2013

ACM SIGBED **Frank Anger Memorial Award** 2012

UCLA nomination for **Microsoft Research Fellowship** 2011-2012

**Best Paper Nomination** in EMSOFT 2012 for the paper entitled “Synthesis of Minimal Error Control Software”

**Best Paper Award** in EMSOFT 2010 for the paper entitled “Automatic Verification of Control System Implementations”

**Team Innovation Award** from Honeywell Technology Solutions, Bangalore, India for the innovation project titled “A Pay-off Matrix Model for Collaborative Monitoring” in 2008

**Exponent-Call For Proposal Award** from Honeywell Technology Solutions, Bangalore, India in recognition and appreciation of collaboratively defining the winning proposal titled “Energy Efficient Algorithms for Distributed Wireless Networks” in 2007

**Individual Excellence Award** from Honeywell Technology Solutions, Bangalore, India for outstanding performance, dedicated efforts, excellent contributions and attitude during the completion of the 1st phase of the project “Translator from C to Simulink models” in 2007

**COMSWARE 2007 top 8 paper**

Finalist for **Sunity Kumar Pal Best Dissertation Award** in the graduating batch of Master of Technology in Computer Science at ISI Kolkata in 2005

**National Scholarship** in recognition of the high position secured in the list of meritorious candidates qualifying for awards in the Higher Secondary Examination in 1999

**National Scholarship** in recognition of the high position secured in the list of meritorious candidates qualifying for awards in the Secondary Examination in 1997

RESEARCH  
FUNDINGS

- Design of Feedback Controllers for Safe Operations of Autonomous Systems (PI)  
 Sponsor: SERB MATRICS  
 Funding: INR 6,60,000  
 Duration: 3 year (February 2020 - February 2023)
- Precise and protective agriculture with a cloud-based multi-UAV system (Faculty Advisor)  
 Sponsor: DST, LockHeed Martin and Tata Trusts  
 Funding: INR 11,00,000  
 Duration: 1 year (August 2019 – July 2020)
- Developing Safe and Secure Autonomous Cyber-Physical Systems (PI)  
 Sponsor: MHRD SPARC  
 Funding: INR 71,76,000  
 Duration: 2 years
- Cloud-Assisted Receding Horizon Planning for Large Scale Multi-Robot Applications (PI)  
 Sponsor: Google Cloud Platform Research Award  
 Funding: USD 6000  
 Duration: 6 months
- Max-Planck Partner Group with Max-Planck Institute for Software Systems (PI)  
 Sponsor: Max-Planck Society  
 Funding: EUR 100000  
 Duration: 5 years
- Automated Synthesis of Motion Plans for Large-Scale Multi-Robot Systems from Complex Specifications (PI)  
 Sponsor: DRDO JCBCAT  
 Funding: INR 1,12,42,600  
 Duration: 3 years
- Formal Verification of Autopilot Software for UAV (PI)  
 Sponsor: Indo-French Centre for the Promotion of Advanced Research (DST-Inria-CNRS Targeted Programme)  
 Funding: INR 37,00,803  
 Duration: 3 years
- Cloud-Assisted Receding Horizon Planning for Large Scale Multi-Robot Applications (PI)  
 Sponsor: Microsoft Azure Research Award Grant  
 Funding: USD 20,000  
 Duration: 1 year
- FMSAFE: A Networked Centre for Formal Methods in Validation and Certification Procedures for Safety- Critical ICT Systems (Co-PI)  
 Sponsor: MHRD IMPRINT Program and Indian Railways  
 Funding: INR 1,15,70,000  
 Duration: 3 years
- A Framework for Synthesizing Robust Motion Primitives for UAVs (PI)  
 Sponsor: DST SERB Early Career Research Award  
 Funding: INR 52,47,000  
 Duration: 3 years
- An End-to-End Software Development Framework for Robot Swarm Applications (PI)  
 Sponsor: DAAD Research Stay Grant  
 Funding: EUR 4,525  
 Duration: 2 months
- Formal Methods Assisted Software Development Frameworks for Complex Robotic Applications (PI)  
 Sponsor: IIT Kanpur Initiation Grant  
 Funding: INR 25,00,000  
 Duration: 2 years

## PUBLICATIONS

- BOOK Balaram Saha and Indranil Saha. **Analog Electronic Circuits**. New Age International, June 2016. ISBN: 978-8122440386.
- JOURNAL Nikhil Kumar Singh and Indranil Saha. **Specification Guided Automatic Debugging of CPS Models**. *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems* (2020)  
(The paper will be presented in the International Conference on Embedded Software (EMSOFT 2020), ACM/IEEE, virtual conference, September 20-25, 2020)
- Ivan Gavran, Rupak majumdar, Indranil Saha. **ANTLAB: A Multi-Robot Task Server**. *ACM Trans. Embedded Comput. Syst.* 16(5): 190:1-190:19 (2017)  
(The paper has been presented in the International Conference on Embedded Software (EMSOFT 2017), ACM/IEEE, Seoul, South Korea, October 15-20, 2017)
- Suman Roy, Janardan Misra and Indranil Saha. **A Simplification of a Real-Time Verification Problem**. *Software Testing, Verification and Reliability* 26(8): 548-571 (2016)
- Indranil Saha, Suman Roy and S. Ramesh. **Formal Verification of Fault-Tolerant Startup Algorithms for Time-Triggered Architectures: A Survey**. *The Proceedings of the IEEE*, special issue on *Industrial Cyber-Physical Systems* (2016)
- Janardan Misra and Indranil Saha. **Artificial Neural Networks in Hardware: A Survey of Two Decades of Progress**. *Neurocomputing* 74(1-3): 239-255 (2010)
- Indranil Saha, Lokesh K. Sambasivan, Ranjeet K. Patro, Subhas K. Ghosh. **Distributed Fault Tolerant Topology Control in Wireless Multi-hop Networks**. *Wireless Networks* 16(6): 1511-1524 (2010)
- Indranil Saha, Bhargab B. Bhattacharya, Sheng Zhang, and Sharad C. Seth. **Planar Straight-Line Embedding of Double-Tree Scan Architecture on a Rectangular Grid**. *Fundamenta Informaticae* 89(2-3): 331-344 (2008)
- CONFERENCE AND WORKSHOP Sankar Narayan Das, Swaprava Nath and Indranil Saha. **OMCoRP: An Online Mechanism for Competitive Robot Prioritization**. In *Proceedings of International Conference on Automated Planning and Scheduling (ICAPS 2021)*, AAAI, Virtual Conference, August 2-13, 2021.
- Tanmoy Kundu and Indranil Saha. **SMT-Based Optimal Deployment of Mobile Rechargers**. In *Proceedings of International Conference on Robotics and Automation (ICRA 2021)*, IEEE, Virtual Conference, May 30- June 5, 2021.
- Danish Khalidi, Dhaval Gujarathi and Indranil Saha. **T\*: A Heuristic Search Based Motion Planning Algorithm for Temporal Logic Specifications** In *Proceedings of International Conference on Robotics and Automation (ICRA 2020)*, IEEE, Paris, France, May 31- June 4, 2020.
- Pratyush Varshney, Gajendra nagar, and Indranil Saha. **DeepControl: Energy-Efficient Control of a Quadrotor using a Deep Neural Network**. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2019)*. IEEE, Macau, China, November 4-8, 2019.
- Tanmoy Kundu and Indranil Saha. **Energy-Aware Temporal Logic Motion Planning for Mobile Robots**. In *Proceedings of International Conference on Robotics and Automation (ICRA 2019)*, IEEE, Montreal, Canada, May 20-24, 2019.
- Houssam Abbas, Indranil Saha, Yasser Shoukry, Rüdiger Ehlers, Georgios Fainekos, Rajesh Gupta, Rupak Majumdar, Dogan Ulus. **Embedded software for robotics: challenges and future directions: special session**. In *Proceedings of the International Conference on Embedded Software (EMSOFT 2018)*, IEEE, Torino, Italy, September 30 - October 5, 2018.

- Tanmoy Kundu and Indranil Saha. **Charging Station Placement for Indoor Robotic Applications.** In *Proceedings of International Conference on Robotics and Automation (ICRA 2018)*, IEEE, Brisbane, Australia, May 21-25, 2018
- Sankar Narayan Das and Indranil Saha. **Receding Horizon Multi-Robot Coverage.** In *Proceedings of the 9th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPs 2017)*, ACM/IEEE, Porto, Portugal, April 11-13, 2018
- Yasser Shoukry, PierLuigi Nuzzo, Ayca Balkan, Indranil Saha, Alberto L. Sangiovanni-Vincentelli, Sanjit A. Seshia, George J. Pappas and Paulo Tabuada. **Linear Temporal Logic Motion Planning for Teams of Underactuated Robots Using Satisfiability Modulo Convex Programming.** In *Proceeding of the 56th IEEE Conference on Decision and Control (CDC 2016)*, IEEE, Melbourne, Australia, December 12-15, 2017
- Ankush Desai, Indranil Saha, Jianqiao Yang, Shaz Qadeer, Sanjit A. Seshia. **DRONA: A Framework for Safe Distributed Mobile Robotics.** In *Proceedings of the 8th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPs 2017)*, ACM/IEEE, Pittsburgh, USA, April 18-21, 2017
- Yasser Shoukry, PierLuigi Nuzzo, Indranil Saha, Alberto L. Sangiovanni-Vincentelli, Sanjit A. Seshia, George J. Pappas and Paulo Tabuada. **Scalable Motion Planning Using Lazy SMT-Based Solving.** In *Proceeding of the 55th IEEE Conference on Decision and Control (CDC 2016)*, IEEE, Las Vegas, USA, December 12-14, 2016
- Indranil Saha, Rattanachai Ramaitithima, Vijay Kumar, George J. Pappas and Sanjit A. Seshia. **Implan: Scalable Incremental Motion Planning for Multi-Robot Systems.** In *Proceedings of the ACM/IEEE 7th International Conference on Cyber-Physical Systems (ICCPs 2016)*, ACM/IEEE, Vienna, Austria, April 11-14, 2016
- Indranil Saha and Rupak Majumdar and Sanjoy Baruah. **Dynamic Scheduling for Networked Control Systems.** In *Proceedings of the International Conference on Hybrid Systems: Computation and Control (HSCC 2015)*, ACM, Seattle, USA, April 14-16, 2015
- Indranil Saha, Rattanachai Ramaitithima, Vijay Kumar, George J. Pappas and Sanjit A. Seshia. **Automated Composition of Motion Primitives for Multi-Robot Systems from Safe LTL Specifications** In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2014)* IEEE/RSJ, Chicago, USA, September 14-18, 2014.
- Rupak Majumdar, Indranil Saha, Koichi Ueda and Hakan Yazarel. **Compositional equivalence checking for Simulink models and C code** In *Proceedings of the 52nd IEEE Conference on Decision and Control (CDC 2013)*, IEEE, Florence, Italy, December 10-13, 2013
- Eva Darulova, Viktor Kuncak, Rupak Majumdar and Indranil Saha. **Synthesis of fixed-point programs.** In *Proceedings of the International Conference on Embedded Software (EMSOFT 2013)*, ACM, Montreal, Canada, September 29-October 4, 2013
- Indranil Saha and Rupak Majumdar. **Trigger Memoization in Self-Triggered Control.** In *Proceedings of the International Conference on Embedded Software (EMSOFT 2012)*, ACM, Tampere, Finland, October 9-14, 2012
- Rupak Majumdar, Indranil Saha, Majid Zamani. **Synthesis of Minimal Error Control Software.** In *Proceedings of the International Conference on Embedded Software (EMSOFT 2012)*, ACM, Tampere, Finland, October 9-14, 2012 (Best Paper Nomination)
- Sam Owre, Indranil Saha and Natarajan Shankar. **Automatic Dimensional Analysis of Cyber-Physical Systems.** In *Proceedings of Formal Methods Europe (FM 2012)*, LNCS, Paris, France, August 27-31, 2012
- Rupak Majumdar, Indranil Saha, K. C. Shashidhar and Zilong Wang. **CLSE: Closed-Loop Symbolic Execution.** In *Proceedings of the 4th NASA Formal Methods Symposium (NFM 2012)*, LNCS, Norfolk, Virginia, USA, April 3-5, 2012

- Indranil Saha and Natarajan Shankar. **ModelRob: A Simulink Library for Model-Based Development of Robot Manipulators.** In *Proceedings of the International Conference on Robotics and Automation (ICRA 2012)*, IEEE, St. Paul, Minnesota, USA, May 14-18, 2012
- Rupak Majumdar, Indranil Saha, Majid Zamani. **Performance-Aware Scheduler Synthesis for Control Systems.** In *Proceedings of the International Conference on Embedded Software (EMSOFT 2011)*, ACM, Taipei, Taiwan, October 9-14, 2011
- Adolfo Anta, Rupak Majumdar, Indranil Saha, Paulo Tabuada. **Automatic Verification of Control System Implementations.** In *Proceedings of the International Conference on Embedded Software (EMSOFT 2010)*, ACM, Scottsdale, USA, October 24-29, 2010 (Best Paper Award)
- Rupak Majumdar, Indranil Saha, Zilong Wang. **Systematic Testing for Control Applications.** In *Proceedings of the 8th ACM/IEEE International Conference on Formal Methods and Models for Codesign (MemoCODE 2010)*. IEEE Computer Society, Grenoble, France, July 26-28, 2010 (Invited Paper)
- Rupak Majumdar, Indranil Saha. **Symbolic Robustness Analysis.** In *Proceedings of the 30th IEEE Real-Time Systems Symposium (RTSS 2009)*, IEEE Computer Society, Washington DC, USA, December 1-4, 2009
- Indranil Saha, Debapriyay Mukhopadhyay. **Quantitative Analysis of a Probabilistic Non-Repudiation Protocol through Model Checking.** In *Proceedings of the 5th International Conference on Information Systems Security (ICISS 2009)*, LNCS 5905, Springer, pp. 292-300, Kolkata, India, December 14-18, 2009
- Janardan Misra, Indranil Saha. **A Reinforcement Model for Collaborative Security and its Formal Analysis.** In *Proceedings of 2009 New Security Paradigm Workshop (NSPW2009)*, ACM, Oxford, UK, September 8-11, 2009
- Indranil Saha, Kuntal Chakraborty, Suman Roy, I. VishnuVardhan, Venkatappaia Kurapati. **An Approach to Reverse Engineering of C program to Simulink Models with Conformance Testing.** In *2nd Indian Software Engineering Conference (ISEC 2009)*, ACM, pp. 137-138, Pune, India, February 22-26, 2009
- Indranil Saha, Debapriyay Mukhopadhyay. **Security against Sybil Attack in Wireless Sensor Network through Location Verification.** In *Proceedings of 10th International Conference on Distributed Computing and Networking (ICDCN 2009)*, LNCS 5408, Springer, pp. 187-192, Hyderabad, India, January 3-6, 2009
- Indranil Saha, Janardan Misra, Suman Roy. **Timeout and Calendar based Finite State Modeling and Verification of Real-Time Systems.** In *Proceedings of the 5th International Symposium on Automated Technology for Verification and Analysis (ATVA 2007)*, LNCS 4762, Springer, pp. 284-299, Tokyo, Japan, October 22 -25, 2007
- Indranil Saha, Suman Roy, Kuntal Chakraborty. **Modeling and Verification of TTCAN Startup Protocol Using Synchronous Calendar.** In *Proceedings of the 5th IEEE International Conference on Software Engineering and Formal Methods (SEFM 2007)*, IEEE Computer Society, pp. 69-79, London, UK, September 11-15, 2007
- Indranil Saha, Debapriyay Mukhopadhyay. **A Distributed Algorithm of Fault Recovery for Stateful Failover.** In *Proceedings the 4th Annual Conference on Theory and Applications of Models of Computation (TAMC07)*, LNCS 4484, Springer, pp. 738-749, Shanghai, China, May 22-25, 2007
- Indranil Saha, Suman Roy. **A Finite State Analysis of Time-triggered CAN (TTCAN) Protocol using Spin.** In *Proceedings of the International Conference on Computing: Theory and Application (ICCTA 2007)*, IEEE Computer Society, pp. 77-81, Kolkata, March 5-7, 2007

- Indranil Saha, Lokesh K. Sambasivan, Ranjeet K. Patro, Subhas K. Ghosh. **Distributed Fault Tolerant Topology Control in Static and Mobile Wireless Ad-hoc Networks.** In *Proceedings of the 2nd International Conference on Communication System Software and Middleware (COMSWARE 2007)*, IEEE Computer Society, Bangalore, India, January 7-12, 2007 (A Top 8 Paper)
- Debapriyay Mukhopadhyay, Indranil Saha. **Location Verification Based Defense against Sybil Attack in Sensor Networks.** In *Proceedings of the 8th International Conference on Distributed Computing and Networking (ICDCN 2006)*, LNCS 4308, Springer, pp. 509-521, Guwahati, India, December 27-30, 2006
- Indranil Saha, Debapriyay Mukhopadhyay, Satyajit Banerjee. **Designing Reliable Architecture for Stateful Fault Tolerance.** In *Proceedings of the 7th International Conference on Parallel and Distributed Computing, Applications and Technologies (PDCAT2006)*, IEEE Computer Society, pp. 545-551, Taipei, Taiwan December 4-7, 2006
- Indranil Saha, Suman Roy. **A Finite State Modeling of AFDX Frame Management using Spin.** In *Proceedings of the 11th International Workshop on Formal Methods for Industrial Critical Systems (FMICS 2006)*, LNCS 4346, Springer, pp. 227-243, Bonn, Germany, August 26-27, 2006
- Indranil Saha, Lokesh K. Sambasivan, Ranjeet K. Patro, Subhas K. Ghosh. **Distributed Fault Tolerant Topology Control in Wireless Ad-hoc Sensor Networks.** In *Proceedings of the 3rd International Conference on Wireless and Optical Communication Networks (WOCN 2006)*, IEEE Computer Society, Bangalore, India, April 11-13, 2006

## TALKS

- Developing Autonomous Multi-Robot Systems for Complex Motions** at
- Workshop on Robotics and Machine Intelligence 2020 organized by the Center of Intelligent Robotics, IIT Allahabad, India, January 2, 2020
  - Verimag, France, July 2, 2019
  - ENSTA ParisTech, June 25, 2019
- Rhocop: Receding Horizon Multi-Robot Coverage** at
- The Robotics Society (India) and IEEE RAS Winter School on Robotics and Autonomous Systems, April 5, 2019
  - Ericson R&D, June 13, 2018
  - 9th International Conference on Cyber-Physical Systems (ICCPS), Porto, Portugal, April 12, 2018
- Automated Task and Motion Plan Generation for Multi-Robot Systems from Complex Specifications** at
- TEQIP Workshop on Robotics and Automation, IIT Kanpur, February 23, 2020
  - QIP Short Term Course on Robotics, IIT Kanpur, India, January 25, 2020
  - ITEC-TEQIP Sponsored International Workshop on Robotics, IIT Kanpur, September 27, 2018
  - QIP Short Term Course on Deep Learning and Computational Intelligence in Automation and Control, IIT Kanpur, December 4, 2017
  - First Cyber-Physical Systems Symposium, IISc, Bengaluru, July 19, 2017
  - DRDO Center of Artificial Intelligence and Robotics (CAIR), Bengaluru, July 18, 2016
- Implan: Scalable Incremental Motion Planning for Multi-Robot Systems** at 7th International Conference on Cyber-Physical Systems (ICCPS), Vienna, Austria, April 14, 2016
- Dynamic Scheduling for Networked Control Systems** at 18th International Conference on Hybrid Systems: Computation and Control (HSCC 2015), Seattle, USA, April 15, 2015
- Automated Software Synthesis for Cyber-Physical Systems** at
- A Short course on Control of Cyber Physical Systems at IIT Kanpur, March 24, 2017
  - Workshop on Development Aspects of Intelligent Adaptive Systems (DIAS 2017), February 5, 2017

- TEQIP Workshop on Advanced Robotics at IIT Kanpur, March 19, 2016
- Microsoft Research, Redmond, USA, April 23, 2015
- Indian Institute of Technology, Kanpur, India, April 7, 2015
- Indian Institute of Science, Bangalore, India, March 30, 2015
- University of Illinois Chicago, USA, March 13, 2015

**Compositional Synthesis of Multi-Robot Motion Plans via SMT Solving at**

- Dagstuhl seminar on verification of cyber-physical systems, Dagstuhl, Germany, March 17-21, 2014
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2014), Chicago, September 15, 2014.

**Program Analysis and Synthesis for Control Applications at**

- CPSGame Seminar Series, UC Berkeley, USA, Dec 6, 2013
- Galois Inc., Portland, USA, May 3, 2013
- ExCAPE project webinar, April 18, 2013
- Shanghai Tech University, Shanghai, China, March 29, 2013

**Trigger Memoization in Self-Triggered Control.** at International Conference on Embedded Software (EMSOFT 2012), Tampere, Finland, October 11, 2012

**Synthesis of Minimal Error Control Software.** at International Conference on Embedded Software (EMSOFT 2012), Tampere, Finland, October 11, 2012

**Automatic Dimensional Analysis of Cyber-Physical Systems** at Formal Methods Europe (FM 2012), Paris, France, August 29, 2012

**ModelRob: A Simulink Library for Model-Based Development of Robot Manipulators** at

- International Conference on Robotics and Automation (ICRA 2012), St. Paul, Minnesota, USA, May 16, 2012
- Fortiss, Munich, Germany, June 12, 2012

**Performance-Aware Scheduler Synthesis for Control Systems** at

- International Conference on Embedded Software (EMSOFT 2012), Taipei, Taiwan, October 12, 2011
- GM India Science Lab, Bangalore, India, November 2, 2011
- Fortiss, Munich, Germany, June 11, 2012

**Automatic Verification of Control System Implementations** at

- International Conference on Embedded Software (EMSOFT 2011), Scottsdale, USA, October 25, 2010
- Computing, Informatics and Decision Systems Engineering Department, Arizona State University, Tempe, USA, October 29, 2010
- In the Meeting of IFIP Working Group 2.3 at SRI International, Menlo Park, CA, USA, June, 2011.
- GM India Science Lab, Bangalore, India, November 2, 2011

**Symbolic Robustness Analysis** at 30th IEEE Real-Time Systems Symposium (RTSS 2009), Washington DC, USA, December 4, 2009

**Quantitative Analysis of a Probabilistic Non-Repudiation Protocol through Model Checking** at 5th International Conference on Information Systems Security (ICISS 2009), Kolkata, India, December 18, 2009

**A Reinforcement Model for Collaborative Security and its Formal Analysis** at New Security Paradigm Workshop (NSPW2009), Oxford, UK, September 10, 2009

**Modeling and Verification of TTCAN Startup Protocol Using Synchronous Calendar** at 5th IEEE International Conference on Software Engineering and Formal Methods (SEFM 2007), London, UK, September 13, 2007



**A Finite State Analysis of Time-triggered CAN (TTCAN) Protocol using Spin** at the International Conference on Computing: Theory and Application (ICCTA 2007), Kolkata, India, March 5, 2007

**Distributed Fault Tolerant Topology Control in Static and Mobile Wireless Ad-hoc Networks** at 2nd International Conference on Communication System Software and Middleware (COMSWARE 2007), Bangalore, India, January 12, 2007

**Location Verification Based Defense against Sybil Attack in Sensor Networks** at 8th International Conference on Distributed Computing and Networking (ICDCN 2006), Guwahati, India, December 30, 2006

**Distributed Fault Tolerant Topology Control in Wireless Ad-hoc Sensor Networks** at 3rd International Conference on Wireless and Optical Communication Networks (WOCN 2006), Bangalore, India, April 11, 2006

## PATENTS

Janardan Misra, Indranil Saha. **System and Method for Collaborative Monitoring of Policy Violations**. Patent application filed from Honeywell, Bangalore, India. Patent application number: 12/057855

Indranil Saha, Janardan Misra. **Probabilistic Modeling of Collaborative Monitoring of Policy Violation**. Patent application filed from Honeywell, Bangalore, India. Patent application number: 12/171225

Janardan Misra, Indranil Saha. **An Adaptive Learning Approach for Enterprise Threat Management**. Patent application filed from Honeywell, Bangalore, India. Patent application number: 12/171231

## SOFTWARE

**Complan**. A tool for compositional motion planning for multi-robot systems with complex specifications.  
<http://www.seas.upenn.edu/~isaha/complan.shtml>

**DimSim**. A Tool for Automatic Dimensional Analysis of Simulink Models.  
<http://www.seas.upenn.edu/~isaha/dimsim.tgz>

**ModelRob**. A Simulink Library for Modeling of Robot Manipulators.  
<http://www.seas.upenn.edu/~isaha/modelrob.tgz>

## STUDENTS

### POSTDOCTORAL RESEARCHERS

Dr. Arvind Adimoolam (Ph.D. from Verimag, July 2020 – till date)  
Dr. Inzepamul Haque (Ph.D. from IISc, February 2020 – till date)  
Dr. Ayan Chakraborty (Ph.D. from IIT Kanpur, January 2019 – June 2020)  
- First Position: Postdoctoral researcher at Leibniz University, Hannover, Germany  
Dr. Sankar Das (Ph.D. from IIT Kharagpur, February 2016 – March 2020)  
- First Position: Principal Research Associate at Accenture Labs, India

### PH.D. STUDENTS

Aishwarya Gupta (CSE, August 2020 – till date, co-advisor with Piyush Rai)  
Jagriti Singh (CSE, January 2020 – till date)  
Shatroopa Saxena (CSE, January 2020 – till date)  
Nikhil Kumar Singh (CSE, January 2020 – till date)  
Arun Jain (CSE, August 2019 – till date, co-advisor with Sharad Malik)  
Aakash (CSE, August 2019 – till date)  
Ratijit Mitra (CSE, January 2017 – present)  
Tanmoy Kundu (CSE, January 2016 – present)

### MS STUDENTS

Amit Dhyani (CSE, August 2019 – till date)  
Priya Purohit (CSE, January 2019 – till date)

Pankaj Siwan (CSE, January 2018 – till date)  
 Nikhil Kumar Singh (CSE, January 2018 – December 2019)  
 Pratyush Varshney (CSE, January 2017 – September 2019)

M.TECH  
STUDENTS

Aakash Kumar Singh (EE, August 2019 – till date)  
 Samvid Maheshbhai Mistry (CSE, August 2019 – till date, co-advisor with Swarnendu Biswas)  
 Niravkumar Hasmukhbhai Panchal (CSE, August 2019 – till date, co-advisor with Piyush Rai)  
 Don Ignatius Cyriac (CSE, August 2019 – till date)  
 Sivarajesh Anantharaj (CSE, August 2019 – till date)  
 Prakhyat Sankeshi (CSE, August 2019 – till date)  
 Kagitha Gopi (CSE, August 2019 – till date)  
 I G Prasad (CSE, January 2019 – till date)  
 Manish Mazumder (CSE, January 2019 – June 2020)  
 Dhaval Sukhanand Gujarathi (CSE, January 2018 – June 2019)  
 Manan Nileshkumar Modi (CSE, January 2018 – June 2019)  
 Ravi Kurail (CSE, January 2017 – June 2018)  
 Danish Khalidi (CSE, January 2017 – June 2018)

B.TECH STUDENTS

Faizan Siddiqui (MSE, Fall 2020) Prashant Kumar (CSE, Fall 2020)  
 Sahil Dhull (CSE, Winter 2020), Jatin Jindal (CSE, Winter 2020), Naishadh Parmar (EE, Summer 2019, Fall 2019, Winter 2020), Pence Mataria (AE, Summer 2019, Fall 2019, Winter 2020)  
 Yasharth Bajpai (EE, Fall 2019), Bhavy Singh (CSE, Summer 2019, Fall 2019)  
 Vivek Agarwal (EE, Summer 2019)  
 Ujjwal Varshney (MSE, Winter 2019), Gajendra Nagar (AE, Monsoon 2018, Winter 2019)  
 Shruti Joshi (EE, Monsoon 2018), Sirshendu Mandal (CSE, Monsoon 2018), Amit Yadav (CSE, Summer 2018, Monsoon 2018), Rituj Beniwal (EE, Summer 2018, Monsoon 2018)  
 Mayank Mittal (EE, Winter 2018), Mrinal Kumar Dogra (CSE, Winter 2018), Madhukant (CSE, Summer 2017, Monsoon 2017, Winter 2018), Tushar Gupta (CSE, Summer 2017, Monsoon 2017, Winter 2018)  
 Abhimanyu Kulkarni (EE, Monsoon 2017), Jaskirat Singh (CSE, Summer 2017, Monsoon 2017), Manish Kumar Bera (CSE, Summer 2017, Monsoon 2017)  
 Abhishek Panda (CSE, Summer 2017), Deepak Gangwar (EE, Summer 2017), Harsh Sinha (EE, Summer 2017)  
 Vemula Akhil (CSE, Winter, 2017), Ashish Kolluri (CSE, Winter, 2017), Shirsopratim Chattopadhyay (MSE, Winter 2017)  
 Pramod Chunduri (CSE, Monsoon 2016), Vivek Verma (CSE, Monsoon 2016)

PROFESSIONAL  
SERVICES

ORGANIZATION

ESWeek 2018 Special Session on Embedded Software for Robotics  
 ETAPS 2018 Workshop on Formal Methods for ML-Based Autonomous Systems

PROGRAM  
COMMITTEE  
MEMBER

MEMOCODE 2021 (Co-Chair), ATVA 2021, EMSOFT 2021, HSCC 2021, AAI 2021  
 MEMOCODE 2020 (Co-Chair), ATVA2020, EMSOFT2020, HSCC 2020, ICCPS 2020  
 ATVA 2019, EMSOFT 2019, ICCPS 2019  
 EMSOFT 2018, HSCC 2018  
 ATVA 2017, HSCC 2017  
 EMSOFT 2014

SESSION CHAIR

IROS 2019

EMSOFT 2018  
 ICCPS 2018  
 HSCC 2017  
 EMSOFT 2015

PUBLICITY CHAIR ICCPS 2019

PANEL MEMBER DST ICPS IoT Proposal Review Panel, IIT Kharagpur, November 2017  
 DST ICPS Security Proposal Review Panel, IIT Kanpur, October 2017  
 NSF CPS Breakthrough Proposal Review Panel, July 2014

REVIEWER - JOURNAL Robotics and Automation Letter (RA-L)  
 IEEE Transactions on Dependable and Secure Computing (TDSC)  
 ACM Transactions on Embedded Computing Systems (TECS)  
 IEEE Transactions on Computers (TC)  
 Springer Journal on Discrete Event Dynamic Systems (DISC)  
 IEEE Transactions on Robotics (TRO)  
 Software and Systems Modeling  
 IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)  
 IEEE Transactions on Automatic Control (TAC)  
 Wireless Communications and Mobile Computing  
 IEEE Communications Magazine

REVIEWER - CONFERENCE ATVA 2021, EMSOFT 2021, IROS 2021, ICRA 2021, HSCC 2021, AAAI 2021  
 ATVA 2020, EMSOFT 2020, ICRA 2020, ICCPS 2020, HSCC 2020  
 IROS 2019, ICCPS 2019, ICRA 2019, ATVA 2019, EMSOFT 2019  
 ICRA 2018, HSCC 2018, EMSOFT 2018  
 ICRA 2017, ACC 2017, HSCC 2017, CDC 2017, CASE 2017, ATVA 2017  
 MemoCODE2016, IROS 2016, CDC 2016  
 ACC 2015, ICRA 2015, HSCC 2015, ICCPS 2015  
 FMCAD 2014, RTSS 2014, EMSOFT 2014, CDC 2014, IROS 2014, CAV 2014, ACC 2014, ICRA 2014  
 FMCAD 2013, IROS 2013, HSCC 2013, FoSSaCS 2013  
 HSCC 2012, RTSS 2012, EMSOFT 2012  
 EMSOFT 2011, ATVA 2011, SPIN 2011, HSCC 2011, TACAS 2011, DATE 2011  
 LPAR 2010, ISCAS 2010  
 TACAS 2009 FSTTCS 2009, RTSS 2009

EXTERNAL EXAMINER JRF to SRF Assessment at IISC Bangalore, 2020  
 M.Tech Theses from IIIT Allahabad, 2020  
 M.Tech Theses from IIIT Allahabad, 2019

## INSTITUTE SERVICES

INSTITUTE COMMITTEES Member of Women's Cell (2020-2022)  
 Senate Scholarship and Prize Committee (2019)  
 Member of Innovation and Incubation Advisory Committee (2019-2021)  
 Faculty Advisor, Robotics Club, Science and Technology Council (2018-2019)  
 Member of Institute Research and Development Committee(2017-2019)  
 Coordinator for the Viswajeet proposal on the Center of Excellence for Autonomous Systems (2017)

DEPARTMENT COMMITTEES Member of Outstanding PhD Thesis Award Committee (2020)

Member of Convocation Award Committee (2020)  
 Member of ACM India Doctoral Dissertation Nomination Committee (2020)  
 Member of Department External PhD Advising Screening Committee (2018 - till date)  
 Member of Department Faculty Search Committee (2018 - till date)  
 Member of Department Admission Committee (2015 - till data)  
 Member of Department Post Graduate Committee (2017-2019)  
 Member of PhD Reformation Committee (2018)  
 Member ESC101 Syllabus Revision Committee (2018)  
 Member of Department's Systems Curriculum Review Committee (2018)  
 Member of Department's M.Tech Curriculum Review Committee (2018)  
 Member of Convocation Award Committee (2017)  
 Member of Comprehensive Examination Process Development Committee (2015)

EXAMINATION  
 COMMITTEE  
 MEMBER

Gourav Takhar (Ph.D. Comprehensive Examination, CSE, 2020)  
 Shivani Agrawal (M.Tech. Defense, EE 2020)  
 Saisha Narang (M.Tech. Defense, CSE 2020)  
 Niharika Ahuja (M.Tech. Defense, CSE 2020)  
 Supriya Suresh (M.Tech. Defense, CSE 2020)  
 Mayank Rawat (M.Tech. Defense, CSE 2020)  
 Amit Chandrak (Ph.D. Comprehensive Examination, CSE, 2020)  
 Rohit Negi (M.S. Defense, CSE, 2020)  
 Shubham Kumar Nigam (Ph.D. Comprehensive Examination, CSE, 2019)  
 Garima Sakya (Ph.D. SOTA Seminar, CSE, 2019)  
 Abhishek Dang (M.Tech. Defense, CSE 2019)  
 Deepak Sironi J (M.Tech. Defense, CSE 2019)  
 Garima Sakya (Ph.D. Comprehensive Examination, CSE, 2019)  
 Saket Arya (M.Tech. Defense, CSE 2019)  
 Vikas Sheel Parashar (M.Tech. Defense, CSE 2019)  
 Ras Diwedi (Ph.D. Peer Review, CSE, 2019)  
 Shivam Bansal (Ph.D. Peer Review, CSE, 2019)  
 Utsav Singh (Ph.D. Peer Review, CSE, 2019)  
 Vinay Kumar Verma (Ph.D. Peer Review, CSE, 2019)  
 Basil Idrees (Ph.D. Comprehensive Examination, EE, 2019)  
 Gufran Siddiqui (Ph.D. Comprehensive Examination, CSE, 2018)  
 Utsav Singh (Ph.D. Comprehensive Examination, CSE, 2018)  
 Ras Diwedi (Ph.D. Depth Comprehensive Examination, CSE, 2018)  
 Nitish Joshi (M.Tech. Defense, CSE, 2018)  
 Sivam Bansal (Ph.D. Comprehensive Examination, CSE, 2018)  
 Aditi Patil (M.Tech. Defense, CSE, 2018)  
 Sneha Kola (M.Tech. Defense, CSE, 2018)  
 Vinay Kumar Verma (Ph.D. Comprehensive Examination, 2018)  
 Saurav Kumar (Ph.D. SOTA, CSE, 2018)  
 Pulkit Kariryaa (M.Tech. Defense, CSE, 2017)  
 Sqn. Ldr. Sunil Sharma (M.Tech. Defense, CSE, 2017)  
 Lt Cdr Amit Singh (M.Tech. Defense, CSE, 2017)  
 Saptarshi Gan (M.Tech. Defense, CSE, 2017)  
 Vineet Purswani (M.Tech. Defense, CSE, 2017)  
 Subhash Yogi (Ph.D. Comprehensive Examination, EE, 2017)  
 Subham Sahai Srivastava (Ph.D. Comprehensive Examination, CSE, 2016)  
 Hrishikesh Terdalkar (Ph.D. Comprehensive Examination, CSE, 2016)  
 Harshavardhan Sharma (M.Tech. Defense, CSE, 2016)  
 Arunjyoti Sinha Roy (M.Tech. Defense, ME, 2016)  
 Meenakshi Gupta (Ph.D. Defense, EE, 2015)  
 Debajyoti De (M.Tech. Defense, CSE, 2015)

DEPARTMENT  
 SEMINAR  
 ORGANIZATION

Hosted Mathworks Seminar on Designing Large Complex Embedded Control Systems using Simulink

Hosted Faculty Candidate Talk by Dr. Shibashis Guha  
Hosted INTEL Seminar on AI from the Data Center to Edge  
Hosted Faculty Candidate Talk by Dr. Jainendra Shukla  
Hosted Mathworks Seminar on Deep Learning  
Hosted Faculty Candidate Talk by Dr. Pramod Subramanian  
Hosted Faculty Candidate Talk by Dr. Rijurekha Sen

## REFERENCES

Prof. Rupak Majumdar  
Max Planck Institute for Software Systems  
Email: rupak@mpi-sws.org  
Phone: +49 631 9303 8500

Prof. Sanjit A. Seshia  
Electrical Engineering and Computer Science Department  
University of California, Berkeley  
Email: sseshia@eecs.berkeley.edu  
Phone: +1 510 643 6968

Prof. George J. Pappas  
Department of Electrical & Systems Engineering  
University of Pennsylvania  
Email:pappasg@seas.upenn.edu  
Phone: +1 215 898 9780

Prof. Rajeev Alur  
Department of Computer and Information Science  
University of Pennsylvania  
Email: alur@cis.upenn.edu  
Phone: +1 215 573 7483

Prof. Vijay Kumar  
GRASP Laboratory  
School of Engineering and Applied Science  
University of Pennsylvania  
Email: kumar@seas.upenn.edu  
Phone: +1 215 898 3630