

Indranil Saha

CONTACT INFORMATION Computer Science Department
University of California Los Angeles
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EDUCATION Ph.D. (Pursuing) in Computer Science, University of California Los Angeles
June 2013 (expected)

- Thesis Proposal: *Automatic Verification and Synthesis of Control Software*
- Adviser: Prof. Rupak Majumdar
- Courses Taken: Computer Aided Verification, Types and Programming Languages, Parallel Programming Languages, Complexity of Problems, SAT-based Program Analysis and Verification, Static Program Analysis, Cyber-Physical Systems, Convex Optimization, Verification and Control of Hybrid Systems
- GPA: 3.97

M.Tech. in Computer Science, Indian Statistical Institute, Kolkata
August 2005

- Thesis: *On Some Layout Problems of Double Tree Scan Architecture for VLSI Testing*
- Adviser: Prof. Bhargab B. Bhattacharya
- Percentage of Marks: 80.33

B.Tech. in Electronics and Communication Engineering, Kalyani Govt. Engg. College
June 2003

- Thesis: *Development of 60 GHz Multimedia Communication Systems for Wireless LAN Applications*
- Adviser: Prof. Rabindranath Bera
- Percentage of Marks: 86.83

RESEARCH INTERESTS Computer Aided Verification
Software Verification and Testing
Cyber-Physical Systems
Time-Triggered Architectures

TECHNICAL SKILLS Operating Systems: Windows, Linux, MAC
Languages: C, Ocaml, Perl, Java, C++
Verification Tools: Spin, SAL, UPPAAL, PRISM, PVS
Miscellaneous: Matlab, Simulink and Stateflow, Lex and Yacc, Yices, HySAT, Lpsolve, CVX

PROFESSIONAL EXPERIENCE

PERMANENT POSITIONS Honeywell Technology Solutions (Research and Technology Group), Bangalore, India.
August 2005 – August 2008

INTERNSHIPS

SRI International (Computer Science laboratory), Menlo park, CA, USA.
June 2010 – September 2010
June 2011– September 2011

Honeywell Technology Solutions(Research and Technology Group), Bangalore, India.
June 2004 – August 2010

TEACHING EXPERIENCE

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

Responsible for 2 hours of tutorial lecture, holding 2 hours of office hours, supervision of projects, preparation of sample answers of homeworks and tests, proctoring mid term and final tests and grading the tests.

ACADEMIC VISIT

Max Planck Institute for Software Systems
November 2010 – December 2010
April 2011 – June 2011
November 2011 – December 2011

PUBLICATIONS

JOURNAL

Janardan Misra and Indranil Saha. **Artificial Neural Networks in Hardware: A Survey of Two Decades of Progress.** Accepted for publication in *Neurocomputing* (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

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, K. C. Shashidhar, Zilong Wang. **CLSE: Closed Loop Symbolic Execution.** In *Proceedings of NASA Formal Methods Symposium (NFM2012)*, LNCS, Norfolk, Virginia, USA, April 3-5, 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, Sanghai, 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.

UNDER
SUBMISSION

Rupak Majumdar, Indranil Saha and Majid Zamani. **Correct-by-Construction Minimal Error Control Software.**

Rupak Majumdar, Indranil Saha, Koichi Ueda and Hakan Yezarel. **Compositional Equivalence Checking for Simulink Models and C Code.**

REVIEWER FOR
JOURNAL

Wireless Communications and Mobile Computing
IEEE Communications Magazine

CONFERENCE

RTSS 2009, FSTTCS 2009
ISCAS 2010, LPAR 2010
DATE 2011, TACAS 2011, HSCC 2011, SPIN 2011, ATVA 2011, EMSOFT 2011

TALKS

Performance-Aware Scheduler Synthesis for Control Systems at International Conference on Embedded Software, Taipei, Taiwan, October 9-14, 2011.

Automatic Verification of Control System Implementations at International Conference on Embedded Software, Scottsdale, USA, October 25, 2009 and at Computing, Informatics and Decision Systems Engineering Department, Arizona State University, Tempe, USA, October 29, 2009.

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.

PATENT

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.

AWARDS

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.

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

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.

REFERENCES

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