

# SUSMIT JHA

JHA@EECS.BERKELEY.EDU

## EDUCATION

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### Doctor of Philosophy (Ph.D.), 2011

DEPARTMENT	Electrical Engineering and Computer Science	UC Berkeley
ADVISER	Professor Sanjit A. Seshia	
GPA	4.0/4.0	
	<b>Leon O. Chua Award 2011</b>	
	<b>2 year Berkeley Fellowship 2006-2008</b>	

### Master of Science (M.S.), 2011

DEPARTMENT	Electrical Engineering and Computer Science	UC Berkeley
GPA	4.0/4.0	

### Bachelor of Technology (B.Tech.), 2006

DEPARTMENT	Computer Science	Indian Institute of Technology, Kharagpur
GPA	9.74/10.0	
	<b>TCS Gold Medal, 2006</b>	

## WORK HISTORY

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RESEARCH SCIENTIST	Intel ( Jan, 2012- )
DESIGN AUTOMATION	Strategic CAD Lab
GRADUATE STUDENT	EECS, UC Berkeley (Spring, 2011)
INSTRUCTOR	Undergraduate Course on Computer Networks
RESEARCH INTERN	SRI International (Summer, 2010; Summer, 2009) Mentor: Dr. Ashish Tiwari Formal Approach to Automated Synthesis
RESEARCH INTERN	EPFL, Lausanne, Switzerland (Summer, 2005) Mentor: Professor Thomas Henzinger Formal Methods Application to Systems Biology
RESEARCH INTERN	Tata Institute of Fundamental Research, India (Summer, 2004) Mentor: Professor R. K. Shyamasundar Software Model Checking

## RESEARCH INTERESTS

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Primary Research Interest	Formal Methods
Application Areas	Programming Languages
	Computer Security
	Hybrid Systems and Cyberphysical Systems

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AUTOMATED SYNTHESIS

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- [1] **Susmit Jha**, Sanjit A. Seshia, and Ashish Tiwari. Synthesis of optimal switching logic for hybrid systems. In *11th International Conference on Embedded Software (EMSOFT)*, 2011.
  - [2] Sumit Gulwani, **Susmit Jha**, and Ashish Tiwari. Automated modular synthesis applied to bit-vector circuits. In *32nd ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI)*, 2011.
  - [3] **Susmit Jha**, Sumit Gulwani, Sanjit Seshia, and Ashish Tiwari. Oracle-guided component-based program synthesis. In *32nd International Conference on Software Engineering (ICSE)*, 2010.
  - [4] **Susmit Jha**, Sumit Gulwani, Sanjit Seshia, and Ashish Tiwari. Synthesizing switching logic for safety and dwell-time requirements. In *1st International Conference on Cyber-physical Systems (ICCPS)*, 2010.
  - [5] Dave King, **Susmit Jha**, Divya Muthukumaran, Trent Jaeger, Somesh Jha, and Sanjit A. Seshia. Automating security mediation placement. In *European Symposium on Programming (ESOP)*, 2010.
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FORMAL METHODS AND AUTOMATED VERIFICATION

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- [6] Cynthia Sturton, **Susmit Jha**, Sanjit A. Seshia, and David Wagner. On voting machine design for verification and testability. In *16th ACM Conference on Computer and Communications Security (CCS)*. ACM, 2009.
- [7] **Susmit Jha**, Rhishikesh Limaye, and Sanjit A. Seshia. Beaver: Engineering an efficient SMT solver for bit-vector arithmetic. In *21st International Conference on Computer-Aided Verification (CAV)*, 2009.
- [8] **Susmit Jha**, Wenchao Li, and Sanjit A. Seshia. Localizing transient faults using dynamic Bayesian networks. In *14th IEEE International High-Level Design Validation and Test Workshop (HLDVT)*, 2009.
- [9] **Susmit Jha** and Sumit Kumar Jha. Randomization based probabilistic approach to detect trojan circuits. In *11th IEEE High Assurance Systems Engineering Symposium (HASE)*, 2008.
- [10] Sumit Kumar Jha and **Susmit Jha**. Random relaxation abstractions for bounded reachability analysis of linear hybrid automata: Distributed randomized abstractions in model checking. In *11th IEEE High Assurance Systems Engineering Symposium (HASE)*, 2008.
- [11] **Susmit Jha**, Bryan A. Brady, and Sanjit A. Seshia. Symbolic Reachability Analysis of Lazy Linear Hybrid Automata. In *5th International Conference on Formal Modelling and Analysis of Timed Systems (FORMATS)*, 2007.

- [12] **Susmit Jha** and R. K. Shyamasundar. Adapting Biochemical Kripke Structures for Distributed Model Checking. *Transactions on Computational Systems Biology*, 2006.
- [13] Sumit Jha, Raj Dutta, Christopher Langmead, **Susmit Jha**, and Emily Sassano. Synthesis of insulin pump controllers from safety specifications using bayesian model validation. In *10th Asia Pacific Bioinformatics Conference (APBC), 2012. Extended version invited to International Journal of Bioinformatics Research and Applications*.

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### SUBMITTED

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- [14] Wenchao Li, **Susmit Jha**, and Sanjit A. Seshia. Power-aware synthesis of dynamic control of error resilience mechanisms. In *Submitted to DAC, 2012*.
- [15] **Susmit Jha** and Sanjit A. Seshia. Automated synthesis of fixed-point numerical code. In *Submitted to PLDI, 2012*.

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### TECHNICAL REPORTS

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- [16] **Susmit Jha**, Sanjit A. Seshia, and Rhishi Limaye. On the computational complexity of satisfiability solving for string theories. In *CoRR abs/0903.2825*, 2009.
- [17] **Susmit Jha**. Statistical analysis of privacy and anonymity guarantees in randomized security protocol implementations. In *CoRR abs/0906.5110*, 2009.

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### TEACHING EXPERIENCE

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SUBSTITUTE LECTURE (2009 & 2011)	I have given lectures in the graduate course on Computer Aided Verification at UC Berkeley in Fall, 2009 and Spring, 2011.
GRADUATE STUDENT INSTRUCTOR (2011)	I was Graduate Student Instructor for upper-division undergraduate course on Computer Networks at UC Berkeley in Spring, 2011. Apart from weekly recitation sessions, I participated in designing and grading exams, homeworks and the term project for this course.
STUDENT INSTRUCTOR FOR NATIONAL SERVICES SCHEME (2002-2004)	I was a student instructor for National Services Scheme during my undergraduate studies at IIT, Kharagpur. I taught physics and mathematics to high school students preparing for college.
SUPERVISING UNDERGRADUATE RESEARCH	I assisted Professor Sanjit Seshia in mentoring research of the following undergraduate students: Kedar Kanitkar (Spring 2007 and Fall 2007), Rohan Desai and Johny Lam (Summer, 2010)

## TOOLS RELEASED AND MAINTAINED

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BEAVER SMT SOLVER	A bit-vector SMT solver focussed on solving non-linear constraints arising in analysis of security applications
AWARDS	Fastest open-source solver in SMTCOMP08 and 09
WEBLINK	<a href="http://uclid.eecs.berkeley.edu/jha/beaver-dist/beaver.html">http://uclid.eecs.berkeley.edu/jha/beaver-dist/beaver.html</a>
IFC SOLVER	A constraint solver for Information Flow Constraints
WEBLINK	<a href="http://www.eecs.berkeley.edu/jha/html/ifc_solver.html">http://www.eecs.berkeley.edu/jha/html/ifc_solver.html</a>

## PROFESSIONAL EXPERIENCE

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- JOURNALS
- Annals of Mathematics and Artificial Intelligence
- REVIEW
- IEEE Embedded System Letters
  - Embedded Hardware Design (Microprocessors and Microsystems)
  - IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems
  - International Journal on Software Tools for Technology Transfer
  - Formal Aspects of Computing
  - Journal on Satisfiability
- CONFERENCES
- Computer Aided Verification (CAV) 2011,2009
- REVIEW
- Tools and Algorithms for the Construction and Analysis of Systems (TACAS) 2011, 2010
  - International Symposium on Circuits and Systems (ISCAS) 2010, 2011, 2012
  - International Conference in Computer-Aided Design (ICCAD) 2011, 2009, 2008
  - Design, Automation and Test in Europe (DATE) 2011, 2010
  - Foundations of Software Science and Computation Structures (FOS-SACS) 2012
  - NASA Formal Methods (NASA-FM) 2011
  - Formal Methods in Computer-Aided Design (FMCAD) 2009
  - Design Automation Conference (DAC) 2011
  - Asia-Pacific Design Automation Conference (ASP-DAC) 2012,2011,2010
  - Satisfiability-Modulo Theory (SMT) 2011
  - International Conference on Computer Design (ICCD) 2011
  - Quality Electronic Design (ISQED) 2010
  - Current Trends in Theory and Practice of Computer Science (SOFSEM) 2009
  - High Level Design, Verification and Test (HLDVT) 2009
  - Constraints in Formal Verification (CFV) 2009, 2011
  - Formal Modeling and Analysis of Timed Systems (FORMATS) 2009

GRADUATE STUDENT ASSOCIATION PEER ADVISOR FOR 2009, 2010, 2011  
INCOMING STUDENTS TO UC BERKELEY

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## AWARDS

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2011	Leon O. Chua Award at UC Berkeley for “outstanding achievement in an area of nonlinear science from any discipline, including biological, engineering, mathematical, physical and social sciences”.
2009	BEAVER rc1.1 is again ranked third in bit-vector division of SMTCOMP (again ranked 1 in open source bit-vector solvers)
2008	Travel Grant for CAV-SMTCOMP 2008 BEAVER 1.0 is ranked third in bit-vector division of SMTCOMP (ranked 1 in open source bit-vector solvers)
2006—2008	2-year Berkeley University Fellowship for graduate studies in Electrical Engineering and Computer Science
2006	TCS Gold Medal and best computer science student award, Indian Institute of Technology, Kharagpur
2004—2006	Letters of Appreciation from the Director, IIT Kharagpur for excellence in academic performance for three consecutive years
2002	Indian National Physics Olympiad 2002 (national top 50) Indian National Chemistry Olympiad 2002 (national top 200)
2000	National Talent Search Examination (NTSE) Scholarship by Ministry of HRD, Government of India

## RELEVANT GRADUATE COURSES

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Nonlinear Control Systems	Integer Programming
Embedded Systems Design and Verification	Computer Aided Verification
Advanced Logic Synthesis	Computer Security
Design and Analysis of Programming Languages	Privacy and Security
Statistical Learning Theory	Statistical Computing
Probabilistic Models in Computational Biology	

## REFERENCES (PLEASE CONTACT ME FOR THEIR EMAIL ADDRESSES)

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PROFESSOR SANJIT A. SESHIA	EECS, UC Berkeley
DR. ASHISH TIWARI	Computer Science Lab, SRI International, Menlo Park
PROFESSOR DAVID WAGNER	EECS, UC Berkeley
PROFESSOR SOMESH JHA	University of Wisconsin, Madison