

## Education

Ph.D.	<b>Carnegie Mellon University, School of Computer Science</b> Computer Science Department Advisor: André Platzer	May 2009 - Present
B.S.	<b>Indiana University, School of Informatics and Computing</b> Major in Computer Science <i>with Departmental Honors</i> <i>with High Distinction</i>	May 2009
B.S.	<b>Indiana University, College of Arts and Sciences</b> Major in Mathematics Minor in Economics <i>with High Distinction</i>	May 2009

## Research Interests

- Formal Verification
- Cyber-Physical Systems
- Hybrid Systems and Distributed Hybrid Systems
- Dynamic Logic
- Automated Theorem Proving

## Fellowships

Department of Energy CSGF – Computational Science Graduate Fellowship	April 2011, 2012, 2013, 2014
American Society for Engineering Education NDSEG – National Defense Science and Engineering Graduate Fellowship (Declined)	April 2011
National Science Foundation GRFP – Graduate Research Fellowship Program	May 2009
Carnegie Mellon University Women@IT Fellowship	February 2009

## Honors/Awards

Heidelberg Laureate Forum Young Researcher	September 2013
Google Anita Borg Memorial Scholarship	June 2009
Association for Computing Machinery Grand Finals (3 <sup>rd</sup> place) in Student Research Competition (SRC)	June 2009
The Winston Churchill Foundation Finalist for Churchill Scholarship	January 2009

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Computing Research Association Finalist in CRA's Outstanding Undergraduate 2009	December 2008
Indiana University Phi Beta Kappa – Academic honor society, inducted as a Junior.	April 2008
Indiana University, School of Informatics and Computing Lilly Undergraduate Scholarship in Informatics	April 2006, 2007, 2008
Indiana University, Department of Mathematics Marie S. Wilcox Scholarship	April 2008, May 2009

### Refereed Journal Publications

Jan-David Quesel, Stefan Mitsch, <u>Sarah Loos</u> , Nikos Aréchiga, and André Platzer. How to model and prove hybrid systems with KeYmaera: A tutorial on safety. Software Tools for Technology Transfer.	To appear
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### Refereed Conference Publications

<u>Sarah M. Loos</u> , David Witmer, Peter Steenkiste, and André Platzer. Efficiency analysis of formally verified adaptive cruise controllers. In the 16 <sup>th</sup> International IEEE Conference on Intelligent Transportation Systems, ITSC, The Hague, Netherlands.	October 2013
<u>Sarah M. Loos</u> , David Renshaw, and André Platzer. Formal verification of distributed aircraft controllers (case study paper). In Hybrid Systems: Computation and Control, HSCC, Philadelphia, USA.	April 2013
Nikos Aréchiga, <u>Sarah M. Loos</u> , André Platzer, and Bruce H. Krogh. Using theorem provers to guarantee closed-loop system properties. In American Control Conference, ACC, Montréal, Canada.	June 2012
Stefan Mitsch, <u>Sarah M. Loos</u> , and André Platzer. Towards formal verification of freeway traffic control. In International Conference on Cyber-Physical Systems, ICCPS, Beijing, China.	April 2012
Akshay Rajhans, Ajinkya Bhave, <u>Sarah M. Loos</u> , Bruce H. Krogh, André Platzer, and David Garlan. Using parameters in architectural views to support heterogeneous design and verification. In the 50 <sup>th</sup> IEEE Conference on Decision and Control and European Control Conference, CDC, Orlando, USA.	December 2011
<u>Sarah M. Loos</u> and André Platzer. Safe intersections: At the crossing of hybrid systems and verification. In the 14 <sup>th</sup> International IEEE Conference on Intelligent Transportation Systems, ITSC, Washington, D.C., USA	October 2011

David Renshaw, Sarah M. Loos, and André Platzer. October 2011  
 Distributed theorem proving for distributed hybrid systems.  
 In International Conference on Formal Engineering Methods, ICFEM, Durham,  
 United Kingdom, Proceedings, LNCS. Springer, 2011.

Sarah M. Loos, André Platzer, and Ligia Nistor. June 2011  
 Adaptive cruise control: Hybrid, distributed, and now formally verified.  
 In Formal Methods, FM, Limerick, Ireland, LNCS. Springer, 2011.

## Practicums/Internships

DOE Oak Ridge National Laboratory May 2013 – August 2013  
 CSGF Fellow Practicum  
 Investigating formal verification of quantum computing devices.

Google May 2008 – August 2008  
 Software Engineer Intern, Google Drive  
 Applications Research & Development

Research Experience for Undergraduates (REU) May 2007 – August 2007  
 Advisor: David S. Wise  
 Improved Strassen's algorithm for rectangular matrix  
 multiplication using Morton-ordered block matrices.

## Teaching Experience

### Universidade do Minho, Braga, Portugal

- Co-Instructor: Foundations of Cyber-Physical Systems March 2014  
 Co-Instructors: André Platzer and João Martins  
 Invited Research School for PhD Students

### École Normale Supérieure (ENS) de Lyon, France

- Co-Instructor: Foundations of Cyber-Physical Systems January 2014  
 Co-Instructor: André Platzer  
 Invited Research School for MS Students

### YouTube Tutorials

- Created video tutorials for the KeYmaera theorem prover Fall 2013  
 available at <http://video.symbolaris.com>

### Carnegie Mellon University, Computer Science Department

- Teaching Assistant: Foundations of Cyber-Physical Systems Fall 2013  
 Primary Instructor: André Platzer
- Teaching Assistant: Undergraduate Algorithms Fall 2011  
 Primary Instructor: Manuel Blum

### Indiana University, Bloomington, Computer Science Department

- Undergraduate Instructor for CS1 (C211) Spring 2006 – Spring 2009  
 Primary Instructor: Suzanne Menzel  
 Undergraduate Instructor of the Year (Spring 2008)  
 (five semesters)

## Appointments and Board Service

<b>Anita Borg Institute for Women and Technology</b>	
Member of the Board of Trustees	May 2011 – May 2014
Strategy Committee, Programs Committee	
Member of the Board of Advisors	October 2009 – May 2011
Co-Chair of the Regional Hopper Conferences Committee	
<b>Association for Computing Machinery – Women (ACM-W)</b>	May 2013 – Present
Co-Editor of the monthly ACM-W Newsletter	
Council Member	
<b>Foundation for Learning Equality</b>	May 2013 – Present
Member of the Board of Directors	

## Summer Schools Attended

<b>NII Shonan Meeting, Shonan Village, Japan</b>	
Topic: Static analysis meets runtime verification	March 2015
<b>Summer School at Marktoberdorf, Germany</b>	
Topic: Software Systems Safety	August 2013
<b>First Summer School on Formal Techniques, USA</b>	
Menlo College, Atherton, CA	May 2011

## Professional Service

<b>Steering Committee Member:</b>	
CPS V&V Industrial Challenges & Foundations Workshop	December 2014
<b>Program Committee Member:</b>	
Grace Hopper Conference for Women in Computing 2013 Career Track Committee	April 2013
Grace Hopper Conference for Women in Computing 2012 Panels, Workshops and Presentations Committee	April 2012
<b>Conference and Journal Reviewer:</b>	
Hybrid Systems: Computation and Control (HSCC'15)	
Brazilian Symposium on Formal Methods (SBMF'14)	
International Symposium on Formal Methods (FM'14)	
Journal of Information and Computation: Special Issue on Hybrid Systems and Biology	
Hybrid Systems: Computation and Control (HSCC'13)	
Multi-conference on Systems and Control (MSC'13)	
International Colloquium on Automata, Languages and Programming (ICALP'13)	
Integrated Formal Methods (iFM'13)	
International Symposium on Formal Methods (FM'12)	
Hybrid Systems: Computation and Control (HSCC'12)	
Conference on Decision and Control (CDC'11)	
Conference on Formal Techniques for Distributed Systems (FMOODS/FORTE'11)	
Formal Modeling and Analysis of Timed Systems (FORMATS'10)	

**University Service (Carnegie Mellon University):**

Ph.D. Admissions Committee, Computer Science Department

January 2012, 2013

Faculty Search and Hiring Committee, Computer Science Department

**Women in Computing:**

Opportunities for Undergraduate Research in Computer Science (OurCS)

2011, 2013

Organizing Committee, Panel Presenter

Women in Technology Sharing Online (WitsOn)

October 2012

Mentor

Indiana Women in Computing Conference (InWIC)

February 2012

Panelist, Judge for Poster Competition

Grace Hopper Conference for Women in Computing

November 2011

Keynote speaker for the GHC scholarship luncheon