

# Debasmita Lohar

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🔗 Debasmita Lohar

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## Education

- 2017 – Ongoing 📖 **Ph.D., MPI-SWS**, Saarbrücken, Germany  
Area: *Automated Verification and Approximation*  
Advisor: Dr. Eva Darulova
- 2014 – 2017 📖 **M.S. by Research, IIT**, Kharagpur, India  
Thesis: *Formal Methods for Probabilistic Failure Analysis of Behavioral Specifications*  
Advisor: Dr. Soumyajit Dey  
GPA: 9.47/10.0
- 2009 – 2013 📖 **B.Tech., Heritage Institute of Technology**, Kolkata, India  
GPA: 8.45/10.0

## Research Interests

- Formal Methods 📖 Program Analysis, Abstract Interpretation, Model Checking
- Approximate Computing 📖 Floating-Point Analysis, Fixed-Point Analysis
- Software Testing 📖 Fuzzing Techniques

## Publications


### Journal Articles

- 1 **Lohar, D.**, Darulova, E., Putot, S., & Goubault, E. (2018). Discrete choice in the presence of numerical uncertainties. *IEEE Trans. Comput. Aided Des. Integr. Circuits Syst.*, 37(11), 2381–2392.  
[🔗 doi:10.1109/TCAD.2018.2857320](https://doi.org/10.1109/TCAD.2018.2857320)

### Conference Proceedings

- 1 **Lohar, D.**, Jeangoudoux, C., Sobel, J., Darulova, E., & Christakis, M. (2021). A two-phase approach for conditional floating-point verification. In *Tools and algorithms for the construction and analysis of systems - 27th international conference, TACAS 2021* (Vol. 12652, pp. 43–63). [🔗 doi:10.1007/978-3-030-72013-1\\_3](https://doi.org/10.1007/978-3-030-72013-1_3)
- 2 **Lohar, D.**, Prokop, M., & Darulova, E. (2019). Sound probabilistic numerical error analysis. In *Integrated formal methods - 15th international conference, IFM 2019* (Vol. 11918, pp. 322–340).  
[🔗 doi:10.1007/978-3-030-34968-4\\_18](https://doi.org/10.1007/978-3-030-34968-4_18)
- 3 Ghosh, S. K., **Lohar, D.**, Das, D., & Dey, S. (2017). Verifying stability guarantees of control software implementations in the presence of sensor level faults: Work-in-progress. In *Proceedings of the thirteenth ACM international conference on embedded software 2017 companion, EMSOFT 2017 companion* (2:1–2:2). [🔗 doi:10.1145/3125503.3125569](https://doi.org/10.1145/3125503.3125569)
- 4 **Lohar, D.**, Dunaboyina, A., Das, D., & Dey, S. (2016). Failure estimation of behavioral specifications. In *Dependable software engineering: Theories, tools, and applications - second international symposium, SETTA 2016* (Vol. 9984, pp. 315–322). [🔗 doi:10.1007/978-3-319-47677-3\\_20](https://doi.org/10.1007/978-3-319-47677-3_20)

5

**Lohar, D., & Dey, S.** (2015). Integrating formal methods with testing for reliability estimation of component based systems. In *2015 IEEE international symposium on software reliability engineering workshops, ISSRE workshops* (pp. 33–36).  doi:10.1109/ISSREW.2015.7392033

## Open Source Contributions

<a href="#">Blossom</a>	🔖	A framework for fuzzing numerical programs
<a href="#">Amazon FreeRTOS</a>	🔖	IoT operating system for microcontroller
<a href="#">Daisy</a>	🔖	A framework for accuracy analysis and synthesis of numerical programs
<a href="#">ProPFA</a>	🔖	Probabilistic Path-based Failure Analyzer

## Work Experience


May 2019 – Jul 2019	🔖	<b>SDE Intern, Amazon Web Services (AWS)</b> , Boston, USA Project: <i>Memory Safety verification of Communication Protocols</i> ( <a href="#">blog post</a> ) Supervisor: Dr. Mark R. Tuttle
Jul 2016 – Sept 2016	🔖	<b>Visiting Scholar, MPI-SWS</b> , Saarbrücken, Germany Project: <i>Verification of Programs with Probabilistic Inputs</i> Advisor: Dr. Eva Darulova
Feb 2016 – May 2016	🔖	<b>Research Consultant, IIT</b> , Kharagpur, India Project: <i>RTOS Validation and Development Support</i> Sponsor: Hindustan Aeronautics Limited Principal Investigator: Prof. Dr. Pallab Dasgupta
Sept 2013 – Jan 2016	🔖	<b>Research Consultant, IIT</b> , Kharagpur, India Project: <i>Architectural and Algorithmic Optimizations for Speech based Communication Interfaces on Mobile Devices</i> Sponsor: Intel Semiconductor (US) Limited Principal Investigator: Dr. Soumyajit Dey

## Mentoring Experience

Jun 2021 – ongoing	🔖	<b>SIGPLAN Long-Term Mentor</b> , Saarbrücken, Germany Mentee: Mugdha Khedkar
May 2021 – Jul 2021	🔖	<b>MPI-SWS Internship (Co-advisor)</b> , Saarbrücken, Germany Project: <i>Probabilistic Analysis of Large Floating-Point Programs</i> Student: Jai Arora
May 2020 – Jul 2020	🔖	<b>MPI-SWS Internship (Co-advisor)</b> , Saarbrücken, Germany Project: <i>Automatic Verification of Floating-point Rust programs</i> Student: Joshua Sobel
Jun. 2018 – Aug. 2018	🔖	<b>DAAD Rise (Advisor)</b> , Saarbrücken, Germany Project: <i>Verifying Floating-Point Computations in Embedded Systems</i> Student: Milos Prokop

## Mentoring Experience (continued)

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- 2016  **B.Tech Thesis (Co-advisor)**, Kharagpur, India  
Project: *Implementation of a Tool for Probabilistic Failure Analysis*  
Student: Anudeep Dunaboyina

## Teaching Assistance





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-  **Advanced Program Analysis (Block-seminar)**, Saarland University, Mar 2019
-  **Program Analysis (WS18/19)**, Saarland University
-  **Fault Tolerant Systems** (Spring 2016, 2015, 2014), IIT Kharagpur
-  **Theory of Computation** (Fall 2015), IIT Kharagpur
-  **Computer Organization and Architecture Lab** (Fall 2014), IIT Kharagpur



## Talks and Posters

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### Talks

- 2021  1. **A Two-Phase Approach for Conditional Floating-Point Verification**, FPTalks, Online  
2. **A Two-Phase Approach for Conditional Floating-Point Verification**, TACAS, Luxembourg (virtual)
- 2019  1. **Sound Probabilistic Numerical Error Analysis**, iFM, Bergen, Norway  
2. **Probabilistic Analysis of Programs with Numerical Uncertainties**, iFM Doctoral Symposium, Bergen, Norway  
3. **Memory Safety Verification of FreeRTOS protocols**, Amazon Web Services, Boston, USA
- 2018  **Discrete Choice in the Presence of Numerical Uncertainties**, EMSOFT, Turin, Italy
- 2015  **Integrating Formal Methods with Testing for Reliability Estimation**, ISREE, Maryland, USA

### Posters

- 2020, 2019, 2018  **Cornell, Maryland, Max Planck Pre-doctoral Research School**, Saarbrücken, Germany  
1. *Verification of Finite-Precision Programs*  
2. *Daisy – Framework for Analysis of Numerical Programs*  
3. *Verifying Floating Point Computations for Branching*
- 2018  **Google's 6th Compiler and Programming Language Summit**, Munich, Germany  
*Discrete Choice in the Presence of Numerical Uncertainties*

## Other Activities

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### Program Committee Member

- Artifact Evaluation  TACAS'22, CAV'21, TACAS'21  
WIP  EMSOFT'19  
Paper Evaluation  VLSI-D'16

## Other Activities (continued)

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### Other Professional Activities

- 2021  Admissions Committee Member of **International Max Planck Research School on Trustworthy Computing (IMPRS-TRUST)**
-  Invited to **Dagstuhl Seminar** on Approximate Systems (21302)
-  Organizing Committee Member of **Girl's Day** at MPI-SWS
- 2014  Organizing Committee Member of **Formal Methods Update Meeting**

### Member of Professional Bodies

- IEEE  Student Member, Young Professionals, Women in Engineering







### Other Diversity Activities

- 2021  1. Participated in Grace Hopper Celebration EMEA (virtual)  
2. Participated in Google's Women's Day Celebration (virtual)
- 2015  Participated in Grace Hopper Celebration India





## Skills

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### Coding







- Functional  Scala, OCaml
- High Level  C, C++, Java
- Hardware Description  Verilog, VHDL
- Low Level  Assembly Language Programming
- Database  SQL
- Others  HTML, CSS, Shell Scripts

### Software Packages

- Formal Methods Tools  Astrée, CBMC, KLEE, Frama-C, LattE
- Hardware Design Suites  Vivado Design Suite, ISE Design Suite, Altera Design Suite
- Others  MATLAB, Netbeans, LaTeX, PocketSphinx
- Operating Systems  Ubuntu, Fedora, CentOS, Yocto, Puppy Linux, MacOS, Windows

## Achievements

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-  Invited to **(virtual) Grace Hopper Celebration EMEA**, 2021
-  Won the **Best Presentation Award** at iFM PhD Symposium, 2019
-  Invited to **Google's 6th Compiler and Programming Language Summit**, 2018
-  Recipient of the **Max Planck Fellowship** for a wholly funded 3 months Internship (Jul. - Sept. 2016) at MPI-SWS, Saarbrücken, Germany
-  Recipient of **Student Scholarship** in Grace Hopper Celebration, India, 2015
-  Qualified in Graduate Aptitude Test in Engineering (GATE) with 99.55 percentile, India, 2013