Debasmita Lohar

Address: Max Planck Institute for Software Systems (MPI-SWS)
Building E1 5, Campus, Room 312, 66123 Saarbrücken, Germany
dlohar@mpi-sws.org https://dlohar.github.io dlohar @DebasmitaLohar

Education

2017 – Ongoing **Ph.D., MPI-SWS**, Saarbrücken, Germany
Thesis: *Expanding the Horizons of Finite-Precision Analysis*
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 Transactions on Computer-Aided Design of Integrated Circuits and Systems*.

Conference/Workshop Proceedings

1. **Lohar**, **D.**, Jeangoudoux, C., Sobel, J., Darulova, E., & Christakis, M. (2021). A two-phase approach for conditional floating-point verification. In *International conference on tools and algorithms for the construction and analysis of systems (TACAS)*.
2. **Lohar**, **D.**, Prokop, M., & Darulova, E. (2019). Sound probabilistic numerical error analysis. In *International conference on integrated formal methods (IFM)*.
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 *International conference on embedded software (EMSOFT) companion*.
4. **Lohar**, **D.**, Dunaboyina, A., Das, D., & Dey, S. (2016). Failure estimation of behavioral specifications. In *International symposium on dependable software engineering: Theories, tools, and applications (SETTA)*.
5. **Lohar**, **D.**, & Dey, S. (2015). Integrating formal methods with testing for reliability estimation of component based systems. In *International symposium on software reliability engineering (ISSRE) workshops*.

Open Source Contributions

Blossom	A framework for fuzzing numerical programs
Amazon FreeRTOS	IoT operating system for microcontroller
Daisy	A framework for accuracy analysis and synthesis of numerical programs
ProPFA	Probabilistic Path-based Failure Analyzer

Work Experience

July 2022 – Oct 2022
Research Intern, Microsoft Research, Bangalore, India
Project: *Synthesizing Data Privacy Attacks on Neural Networks*
Supervisors: Dr. Akash Lal, Dr. Satya Lokam, and Dr. Rahul Sharma

May 2019 – Jul 2019
SDE Intern, Amazon Web Services (AWS), Boston, USA
Project: *Memory Safety verification of Communication Protocols* (blog post)
Supervisor: Dr. Mark R. Tuttle

Jul 2016 – Sept 2016
Visiting Scholar, MPI-SWS, Saarbrücken, Germany
Project: *Verification of Programs with Probabilistic Inputs*
Advisor: Dr. Eva Darulova

Feb 2016 – May 2016
Research Consultant, IIT, Kharagpur, India
Project: *RTOS Validation and Development Support*
Sponsor: Hindustan Aeronautics Limited
Principal Investigator: Prof. Dr. Pallab Dasgupta

Sept 2013 – Jan 2016
Research Consultant, IIT, Kharagpur, India
Project: *Architectural and Algorithmic Optimizations for speech-based Communication Interfaces on Mobile Devices*
Sponsor: Intel Semiconductor (US) Limited
Principal Investigator: Dr. Soumyajit Dey

Mentoring Experience

Jun 2021 – Jun 2022
SIGPLAN Long-Term Mentor, Saarbrücken, Germany
Mentee: Mugdha Khedkar, Paderborn University

May 2021 – Jul 2021
MPI-SWS Internship (Co-advisor), Saarbrücken, Germany
Project: *Probabilistic Analysis of Large Floating-Point Programs*
Student: Jai Arora, IIT Delhi

May 2020 – Jul 2020
MPI-SWS Internship (Co-advisor), Saarbrücken, Germany
Project: *Automatic Verification of Floating-point Rust programs*
Student: Joshua Sobel, University of Rochester

Jun. 2018 – Aug. 2018
DAAD Rise (Advisor), Saarbrücken, Germany
Project: *Verifying Floating-Point Computations in Embedded Systems*
Student: Milos Prokop, University of Edinburgh

Mentoring Experience (continued)

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

Teaching Assistance

- **Advanced Program Analysis (Block-seminar)**, Saarland University, March 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

Talks

2022 — **Expanding the Horizons of Finite-Precision Analysis**, Microsoft Research, India

2021 — 1. **A Two-Phase Approach for Conditional Floating-Point Verification**, FPTalks (virtual)
2. **A Two-Phase Approach for Conditional Floating-Point Verification**, TACAS, Luxembourg (virtual)

2019 — 1. **Sound Probabilistic Numerical Error Analysis**, iFM, Norway
2. **Probabilistic Analysis of Programs with Numerical Uncertainties**, iFM Doctoral Symposium, Norway
3. **Memory Safety Verification of FreeRTOS**, Amazon Web Services, USA

2018 — **Discrete Choice in the Presence of Numerical Uncertainties**, EMSOFT, Italy

2015 — **Integrating Formal Methods with Testing for Reliability Estimation**, ISREEW, 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

Program Committee Member

Artifact Evaluation — CAV'23, TACAS'22, CAV'21, TACAS'21
WIP — EMSOFT'19
Paper Evaluation — VLSI-D'16

Other Activities (continued)

Other Professional Activities

- 2021 **Student Election Committee Member** of MPI-SWS
- **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

Coding

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

Software Packages

Formal Methods Tools	Astrée, CBMC, Z3, 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

- Selected to participate in the 10th **Heidelberg Laureate Forum**, 2023
- 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

References

Available on Request