DEBASMITA LOHAR https://people.mpi-sws.org/~dlohar
Date of Birth: Sept. 2, 1991
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Education

- **Max Planck Institute for Software Systems** — Saarbrücken, Germany
  Ph.D. in Computer Science — May 2017 - Ongoing
  - **Advisor:** Dr. Eva Darulova
- **Indian Institute of Technology** — Kharagpur, India
  M.S. by Research in Computer Science and Engineering — Jan. 2014 - Mar. 2017
  - **Advisor:** Dr. Soumyajit Dey
  - **GPA:** 9.47/10
- **Graduate Aptitude Test in Engineering Examination (GATE)** — India
  Computer Science & Engineering — 2013
  - Percentile: 99.55
- **Heritage Institute of Technology** — Kolkata, India
  B.Tech. in Computer Science and Engineering — 2009 - 2013
  - **GPA:** 8.45/10

Research Interests

- **Formal Methods:** Program Analysis, Abstract Interpretation, Model Checking
- **Approximate Computing:** Finite precision Analysis
- **Software Testing:** Fuzzing Techniques

Publications

- **Debasmita Lohar**, Milos Prokop, Eva Darulova, "**Sound Probabilistic Numerical Error Analysis**", iFM 2019
- **Debasmita Lohar**, Eva Darulova, Sylvie Putot, Eric Goubault, "**Discrete Choice in the Presence of Numerical Uncertainties**", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, 2018
- Saurav Kumar Ghosh, **Debasmita Lohar**, Dibyendu Das, Soumyajit Dey, "**Work-in-Progress: Verifying Stability Guarantees of Control Software Implementations in the Presence of Sensor Level Faults**", EMSOFT 2017
- **Debasmita Lohar**, Anudeep Dunaboyina, Dibyendu Das, and Soumyajit Dey, "**Failure Estimation of Behavioral Specifications**", SETTA 2016
- **Debasmita Lohar**, Soumyajit Dey; "**Integrating Formal Methods with Testing for Reliability Estimation of Component Based Systems**", 26th IEEE International Symposium on Software Reliability Engineering Workshops (ISSREW) 2015

Research Projects

- **Conditional Verification of Finite Precision Programs** Saarbrücken, Germany
  Max Planck Institute for Software Systems 2019 - Ongoing
  - In this project we aim to scale up analysis of numerical kernels to real world applications by combining static program analysis and fuzzing techniques.
- **Sound Probabilistic Analysis for Finite Precision Programs** Saarbrücken, Germany
  Max Planck Institute for Software Systems 2017 - 2018
  - In this project we investigate the effects of round-off errors introduced by finite-precision arithmetic soundly in the presence of probabilistic inputs.
- **Formal Methods for Probabilistic Failure Analysis** Kharagpur, India
  Indian Institute of Technology 2015 - 2016
  - In this project we have developed a framework using program analysis techniques for computing failure probability of programs under the fail-stop failure model.
- **Software Reliability Analysis using Formal Methods** Kharagpur, India
  Indian Institute of Technology 2014 - 2015
  - In this project we provide a formal modeling of the interactions among software components in terms of reliability for component-based software systems.

Open Source Contributions

- **Blossom: A framework for fuzzing numerical programs**
  Link: https://github.com/dlohar/blossom
- **Amazon FreeRTOS: IoT operating system for microcontrollers.**
  Link: https://github.com/dlohar/amazon-freertos
- **Daisy: A framework for accuracy analysis and synthesis of numerical programs.**
  Link: https://github.com/malyzajko/daisy
- **ProPFA: Probabilistic Path-based Failure Analyzer.**
  Link: https://github.com/dlohar/ProPFA

Work Experiences

- **Software Development Engineer** May 2019 - Jul. 2019
  Amazon Web Services (AWS) Boston, USA
  - **Project:** Memory Safety verification of Communication Protocols
    Link: https://www.freertos.org/2020/02/ensuring-the-memory-safety-of-freertos-part-1.html
- **Visiting Scholar** Jul. 2016 - Sept. 2016
  Max Planck Institute for Software Systems (MPI-SWS) Saarbrücken, Germany
  - **Project:** Automated Verification and Approximation
  - **Supervisor:** Dr. Eva Darulova
  - **Responsibility:** To analyze Programs with Imprecise Probabilistic Inputs with complex distributions statically for inferring error bounds
- **Research Consultant** Feb. 2016 - May 2016
  Indian Institute of Technology Kharagpur
  - **Project:** Verification of Real Time Operating Systems
  - **Principal Investigator:** Prof. (Dr.) Pallab Dasgupta
  - **Sponsor:** Hindustan Aeronautics Limited.

- **Responsibility:** To verify a Real Time Operating System using Model Checking

- **Research Consultant** Sept. 2013 - Jan. 2016
  Indian Institute of Technology Kharagpur
  - **Project:** Architectural and Algorithmic Optimizations for Speech based Communication Interfaces on Mobile Devices
  - **Principal Investigator:** Dr. Soumyajit Dey
  - **Sponsor:** Intel Semiconductor (US) Limited
  - **Responsibility:** To develop a hardware-software co-design of a GMM/HMM based Speech Recognition System

Mentoring Experiences

- **MPI-SWS Internship** May 2020 - Jul. 2020
  MPI-SWS Saarbrücken, Germany
  - **Project:** Automatic Verification of Floating-point Rust programs
  - **Student:** Joshua Sobel
- **DAAD Rise** Jun. 2018 - Aug. 2018
  Max Planck Institute for Software Systems Saarbrücken, Germany
  - **Project:** Verifying floating-point computations in Embedded Systems
  - **Student:** Milos Prokop
- **B.Tech Thesis** 2016
  Indian Institute of Technology (IIT), Kharagpur Kharagpur, India
  - **Project:** Implementation of a tool for Probabilistic Failure Analysis
  - **Student:** Anudeep Dunaboyina

Teaching Experiences

- **Graduate Teaching Assistant** Mar. 2019
  Saarland University Saarbrücken, Germany
  - Advanced Program Analysis (Block-seminar)
- **Graduate Teaching Assistant** Oct. 2018 - Mar. 2019
  Saarland University Saarbrücken, Germany
  - Program Analysis (WS18/19)
- **Graduate Teaching Assistant** Jan. 2014 - Mar. 2017
  Indian Institute of Technology Kharagpur, India
  - Fault Tolerant Systems (CS60058; Spring 2016, 2015, 2014)
  - Theory of Computation (CS41001; Fall 2015)
  - Computer Organization and Architecture Lab (Fall 2014)

Talks

- **iFM** 2019
  Sound Probabilistic Numerical Error Analysis Bergen, Norway
- **iFM Doctoral Symposium** 2019
  Probabilistic Analysis of Programs with Numerical Uncertainties Bergen, Norway
- **Amazon Web Services** 2019
  Memory Safety Verification of FreeRTOS protocols Boston, USA

- **EMSOFT** 2018
  Discrete Choice in the Presence of Numerical Uncertainties Turin, Italy
- **ISSRE** 2015
  Integrating Formal Methods with Testing for Reliability Estimation Maryland, USA

Posters

- **Cornell, Maryland, Max Planck Pre-doctoral Research School** 2020
  Verification of Finite-Precision Programs Saarbrücken, Germany
- **Cornell, Maryland, Max Planck Pre-doctoral Research School** 2019
  Daisy-Framework for Analysis of Numerical Programs Saarbrücken, Germany
- **Google's 6th Compiler and Programming Language Summit** 2018
  Discrete Choice in the Presence of Numerical Uncertainties Munich, Germany
- **Cornell, Maryland, Max Planck Pre-doctoral Research School** 2017, 2018
  Verifying Floating Point Computations for Branching Saarbrücken, Germany

Other Academic Activities

- **Artifact Evaluation Committee Member** 2021
  TACAS Luxembourg
- **WIP Program Committee Member** 2019
  EMSOFT New York
- **Conference Paper Reviewer** 2016
  VLSI Design India
- **Local Organizing Committee Member** 2014
  Formal Methods Update Meeting India

Member of Professional Bodies

- **IEEE**
  Student Member, Young Professionals, Women in Engineering Germany

Skills

- **Programming:**
  High Level Languages: C, C++, Java
  Functional Programming Language: Scala, OCaml
  Hardware Description Language: Verilog, VHDL
  Low Level Language: Assembly Language Programming
  Database Coding: SQL
  Others: HTML, CSS, Shell Scripts, MATLAB, GNU
- **Software Packages:**
  Formal Methods Tools and Packages: 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

- 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) in Max Planck Institute for Software Systems (MPI-SWS), Saarbruecken, Germany.
- Recipient of **Student Scholarship** in Grace Hopper Celebration, India, 2015.
- Completed a Tutorial (certified by IEEE Reliability Society) on System and Software Reliability at ISSRE Nov. 2-5, 2015, Gaithersburg, Maryland.

Recreational Pursuits

- Received Senior Diploma in Rabindrasangeet from Surer Maya Sangeet Samaj, West Bengal.
- Completed 4^{th} year in Vocal Classical from Prayag Sangit Samiti, Allahbad.
- Received Senior Diploma (Ankan Sree) in Painting from Bangiyo Sangeet Parishad, West Bengal.