

Shubham Ugare

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Research Interest

My research interest lies in the intersection of Programming Languages and Machine Learning. Currently, I am working on verifying the properties of neural networks using abstract interpretation and other formal methods.

Education

- **University of Illinois, Urbana-Champaign** IL, USA
PhD 2020 -
– Computer Science 4.0/4.0
(Adviser: Prof. Sasa Misailovic, Prof. Gagandeep Singh)
- **Indian Institute of Technology, Guwahati** Guwahati, India
BTech 2014 - 2018
– Major in Computer Science and minor in Mathematics - 9.42/10.0
[Bachelor thesis](#) : Succinct data structure problems (Adviser: Prof. Srinivasa Rao Satti)

Publications

- **A General Construction for Abstract Interpretation of Higher-Order Automatic Differentiation**
Jacob Laurel, Rem Yang, Shubham Ugare, Robert Nagel, Gagandeep Singh, Sasa Misailovic
In OOPSLA 2022
- **Proof Transfer for Fast Certification of Multiple Approximate Neural Networks**
Shubham Ugare, Gagandeep Singh, Sasa Misailovic
In OOPSLA 2022
- **Statheros: A Compiler for Efficient Low-Precision Probabilistic Programming**
Jacob Laurel, Rem Yang, Atharva Sehgal, Shubham Ugare, Sasa Misailovic
In DAC 2021
- **Secure Medical Image Analysis with CrypTFlow***
Javier Alvarez-Valle, Pratik Bhatu, Nishanth Chandran, Divya Gupta, Aditya Nori, Aseem Rastogi, Mayank Rathee, Rahul Sharma, Shubham Ugare
In PPML@NeurIPS 2020
- **Approximate Query Processing over Static Sets and Sliding Windows***
Ran Ben Basat, Seungbum Jo, Srinivasa Rao Satti, Shubham Ugare.
In ISAAC 2018 and TCS 2021 [Slides](#) [Full paper](#)
(* marked author names are alphabetically sorted)

Work experience

- **Uber** San Francisco, USA
Research Software Engineer *May 2022 - Aug 2022*
 - **Static Program Analysis to detect nil panics**
Worked on a static analysis tool to statically detect potential nil panics in Go. Implemented a struct initialization checker that identifies potentially uninitialized fields that can cause nil panics.
- **Microsoft Research** Bangalore, India
Research Software Engineer *Oct 2019 - Jul 2020*
 - Worked on SeeDot compiler that performs fixed-point compilation of ML models. Implemented a SeeDot compiler for ONNX frontend.
- **Uber** Bangalore, India
Software Engineer *July 2018 - Oct 2019*
 - Worked on Uber Lite and Uber bus applications in a team of 6 android engineers. Launched it to 25 countries.
 - **Static Program Analysis to detect NPEs**
Worked on NullAway static analysis tool to statically find JAVA NPEs. [Contribution](#)
- **Max Plank Institute of Software Systems** Kaiserslautern, Germany
Research fellow *May 2018 - July 2018*
 - Worked on improving the performance of the Horn-ICE tool and submitted the tool in the Invariant synthesis track of SyGus-comp 2018. [Technical Report](#)
- **Seoul National University** Seoul, South Korea
Research Intern *May 2017 - July 2017*
 - Worked on finding succinct data structures to solve query processing problems. [ArXiv link](#)

Achievements

1. Competitive Programming competitions
 - **ACM ICPC**: Ranked **5th** in ACM ICPC Kharagpur regionals and **7th** rank in ACM ICPC Chennai regionals.
 - **Goldman Sachs Quantify**: **1st** rank with 3500+ participants.
 - **Codenation 2017**: **4th** rank in the contests with 8000+ participants.
2. Pre-university exams
 - **Mathematics Olympiad 2013 and 2014**: Qualified for the Indian National Mathematics Olympiad (INMO 2013) by securing **13th** rank and for INMO 2014 by securing **6th** rank in state.
 - **JEE 2014**: Ranked in top 0.1% students in 1.3 million candidates appearing for the test.