Keyur Parag Joshi

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Education

- **University of Illinois at Urbana-Champaign (UIUC), USA**
  August 2017 – Present
  Ph.D Student in Computer Science advised by Sasa Misailovic
- **Indian Institute of Technology, Hyderabad (IITH), India**
  August 2013 – May 2017
  Bachelor of Technology (Honours) in Computer Science and Engineering
  Valedictorian

Research Interests

- Programming languages and software engineering
- Testing and analysis of approximate and/or unreliable programs

Current Research

I am currently a Research Assistant at UIUC advised by Sasa Misailovic. My current projects include:

- **Dynamic Tracking of Reliability, Accuracy, and Fairness for Approximate Parallel Programs:** We bring existing analyses that are only available for sequential programs to parallel programs by generating an equivalent sequential program from the parallel program.
- **Reliability of Programs with Recovery Mechanisms:** Quantifying the increase in reliability of unreliable programs that attempt to fix errors, for example, by re-executing computations. Existing analyses have limited support for reasoning about such recovery mechanisms.
- **Software Approximation Techniques for ApproxHPVM:** Augmenting the portfolio of approximate techniques in ApproxHPVM (an accuracy aware portable compiler IR) with software approximations, such as approximate convolution, to provide potentially better approximation choices to ApproxHPVM's accuracy tuner.

Honors and Awards

- Awarded a travel grant by the LLVM Foundation to attend SC 2017
- Awarded the President of India's Gold medal for achieving the highest GPA across all undergraduate programs at IIT Hyderabad (graduated in 2013)

Previous Research Experience

- Spring 2018 – Co-organized the Brett Daniel Software Engineering Seminar at UIUC
- Summer 2016 – Internship at ENS/INRIA Paris under Dr. Albert Cohen
- Summer 2016 – Attended the Maths-CS-HPC Spring School at Lyon, France

Publications

- **Statistical Algorithmic Profiling for Randomized Approximate Programs**
  Keyur Joshi, Vimuth Fernando, Sasa Misailovic
  41st ACM/IEEE International Conference on Software Engineering (ICSE 2019) (21% acceptance rate)
- **Verifying Safety and Accuracy of Approximate Parallel Programs via Canonical Sequentialization**
  Vimuth Fernando, **Keyur Joshi**, Sasa Misailovic
  34th ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA/SPLASH 2019) (36% acceptance rate)
- **ApproxHPVM: A Portable Compiler IR for Accuracy-Aware Optimizations**
  Hashim Sharif, Prakalp Srivastava, Muhammad Huzaifa, Maria Kotsifakou, **Keyur Joshi**, Yasmin Sarita, Nathan Zhao, Vikram S. Adve, Sasa Misailovic, Sarita Adve
  34th ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA/SPLASH 2019) (36% acceptance rate)
- **Identifying Optimal Parameters for Randomized Approximate Algorithms**
  Vimuth Fernando, **Keyur Joshi**, Darko Marinov, Sasa Misailovic
  Workshop on Approximate Computing Across the Stack (WAX 2019) (Co-located with PLDI 2019)

Talks and Poster Presentations

- **Poster Presentation:** AxProf: Statistical Algorithmic Profiling for Randomized Approximate Programs: at Midwest PL Summit 2019
- **Conference Talk:** Statistical Algorithmic Profiling for Randomized Approximate Programs: at ICSE 2019
- **Seminar Talk:** Statistical Algorithmic Profiling for Randomized Approximate Programs: at the Brett Daniel Software Engineering Seminar at UIUC
- **Seminar Talk:** Monitor-Based Statistical Model Checking for Weighted Metric Temporal Logic: at the Brett Daniel Software Engineering Seminar at UIUC
- **Lightning Talk:** Implementation of a Cache Miss Calculator in LLVM/Polly: at the LLVM in HPC workshop, SC 2017
- **Seminar Talk:** Triangular inequality for compiler-based strength reduction: at the Brett Daniel Software Engineering Seminar at UIUC

Tools

- **AxProf:** Statistical Algorithmic Profiling for Randomized Approximate Programs: available with tutorial at axprof.org

Skills

- **Languages:** Extensive experience with C,C++, Python, Java, LaTeX, and LLVM
- **Programming Environments:** Experience using Visual Studio and Emacs

Activities

- **Leadership:** Served as the head of the Programming and Security Club at IIT Hyderabad
- **Social Service:** Volunteered for the National Service Scheme (NSS) of India