Keyur Parag Joshi

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Education

- **University of Illinois at Urbana-Champaign (UIUC), USA**
  August 2017 – May 2022 (Expected)
  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 and systems
- Novel applications of approximations to domains such as Internet of Things and digital agriculture

Current Research

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

- **Uncertainty estimation of autonomous robots:** Modern autonomous robots use complex systems such as neural networks and filters to estimate their position and correct for errors. We adapt techniques for estimating uncertainty, such as polynomial chaos, to applications that include such complex systems.
- **Efficient estimation of program accuracy in the face of bitflips:** We combine the precise analysis of the Approxylizer tool with the speed of the Chisel tool to speed up analysis of accuracy of large programs in the face of bitflips.

Publications

- **Diamont: Dynamic Monitoring of Uncertainty for Distributed Asynchronous Programs**
  Vimuth Fernando, **Keyur Joshi**, Jacob Laurel, Sasa Misailovic
  International Conference on Runtime Verification (RV 2021)
- **ApproxTuner: A Compiler and Runtime System for Adaptive Approximations**
  Hashim Sharif, Maria Kotsifakou, Yifan Zhao, Akash Kothari, Ben Schreiber, Elizabeth Wang, Yasmin Sarita, Nathan Zhao, **Keyur Joshi**, Vikram Adve, Sasa Misailovic, Sarita Adve
  ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPOPP 2021)
- **Aloe: Verifying Reliability of Approximate Programs in the Presence of Recovery Mechanisms**
  Keyur Joshi, Vimuth Fernando, Sasa Misailovic
  IEEE/ACM International Symposium on Code Generation and Optimization (CGO 2020)
- **Statistical Algorithmic Profiling for Randomized Approximate Programs**
  Keyur Joshi, Vimuth Fernando, Sasa Misailovic
  41st ACM/IEEE International Conference on Software Engineering (ICSE 2019)
- **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)

- **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)

- **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)

Professional Experiences

- Summer 2021 – Member of the OOPSLA 2021 Artifact Evaluation Committee
- Fall 2020 – Teaching assistant for the Software Engineering course at UIUC
- Spring 2018 – Co-organized the Brett Daniel Software Engineering Seminar at UIUC

Talks and Poster Presentations

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

Tools

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