Sharjeel Khan

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🎓 EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY   **AUG 2018 - PRESENT**
PhD in Computer Science
Advisor: Dr. Santosh Pande
GPA: 4.0

CARNEGIE MELLON UNIVERSITY   **AUG 2013 - MAY 2017**
Bachelor of Science in Computer Science
Minor in Mathematical Sciences
University Honors
Dean's List (5 semesters)
GPA: 3.57

📄 PUBLICATIONS

CONFERENCE PUBLICATIONS

Pythia: Compiler-Guided Defense Against Non-Control Data Attacks
Sharjeel Khan, Bodhisatwa Chatterjee, and Santosh Pande.
ASPLOS'24: ACM International Conference on Architectural Support for Programming Languages and Operating Systems, San Diego, California, 2023.
[Paper] [Slides]

Beacons: A End-to-End Compiler Framework for Predicting and Utilizing Dynamic Loop Characteristics
Girish Mururu*, Sharjeel Khan*, Bodhisatwa Chatterjee*, Chao Chen, Chris Porter, Ada Gavrilovska, and Santosh Pande.
(* Authors contributed equally)
OOPSLA'23: ACM Object-Oriented Programming, Systems, Languages and Applications, Cascais, Portugal, 2023.
[Paper] [Code] [Slides]

A High Performance Computing Architecture for Real-Time Digital Emulation of RF Interactions
Mandovi Mukherjee*, Nael Mizanur Rahman*, Coleman DeLude*, Joseph Driscoll*, Uday Kamal, Jongseok Woo, Jamin Seo, Sudarshan Sharma, Xiangyu Mao, Payman Behnam, Sharjeel Khan, Daehyun Kim, Jianming Tong, Prachi Sinha, Santosh Pande, Tushar Krishna, Justin Romberg, Madhavan Swaminathan, and Saibal Mukhopadhyay.
(* Authors contributed equally)
RadarConf'23: IEEE Radar Conference, San Antonio, Texas, 2023.
[Paper]

Decker: Attack Surface Reduction via On-demand Code Mapping
Chris Porter, Sharjeel Khan, and Santosh Pande.
ASPLOS'23: ACM International Conference on Architectural Support for Programming Languages and Operating Systems, Vancouver, Canada, 2023.
[Paper] [Code] [Slides]

Com-CAS: Effective Cache Apportioning Under Compiler Guidance
Bodhisatwa Chatterjee, Sharjeel Khan, and Santosh Pande.
PACT'22: International Conference on Parallel Architectures and Compilation Techniques, Chicago, Illinois, 2022.
[Paper] [Code] [Slides]

VICO : Demand-driven Verification for Improving Compiler Optimizations
Sharjeel Khan, Bodhisatwa Chatterjee, and Santosh Pande.
ICS'22: ACM International Conference on Supercomputing, Virtual, 2022.
[Paper] [Slides]

JOURNAL PUBLICATIONS

Real-time Digital RF Emulation - II: A Near Memory Custom Accelerator
Xiangyu Mao*, Mandovi Mukherjee*, Nael Mizanur Rahman*, Coleman DeLude*, Joseph Driscoll*, Sudarshan Sharma,
Payman Behnam, Uday Kamal, Jongseok Woo, Daehyun Kim, Sharjeel Khan, Jianming Tong, Jamin Seo, Prachi Sinha,
Madhavan Swaminathan, Tushar Krishna, Santosh Pande, Justin Romberg, and Saibal Mukhopadhyay.
(* Authors contributed equally)
IEEE Transactions on Radar Systems, 2024.
[Paper]

Real-time Digital RF Emulation - I: The Direct Path Computational Model
Coleman DeLude*, Joseph Driscoll*, Mandovi Mukherjee*, Nael Mizanur Rahman*, Xiangyu Mao, Uday Kamal,
Sharjeel Khan, Hariharan Sivaraman, Eric Huang, Jeffrey McHarg, Madhavan Swaminathan, Santosh Pande, Saibal
Mukhopadhyay, and Justin Romberg.
(* Authors contributed equally)
IEEE Transactions on Radar Systems, 2024.
[Paper]

WORKSHOP PUBLICATIONS

Formalization of Automated Trading Systems in a Concurrent Linear Framework (CLF)
Iliano Cervesato, Sharjeel Khan, Giselle Reis, and Dragisa Zunic.
Linearity & TLLA @ FLOC'18: International Workshop on Linearity and Trends in Linear Logic and Applications,
Oxford, UK, 2018.
[Paper] [Code] [Slides]

ARXIV

Qwerty: A Basis-Oriented Quantum Programming Language
Austin J. Adams, Sharjeel Khan, Jeffrey Young, and Thomas M. Conte.
[Paper]

Combined Static Analysis and Machine Learning Prediction for Application Debloating
Chris Porter, Sharjeel Khan, Kangqi Ni and Santosh Pande.
[Paper]

Practical compilation of fexprs using partial evaluation
Nathan Braswell, Sharjeel Khan, and Santosh Pande.
[Paper]

Biscuit: A Compiler Assisted Scheduler for Detecting and Mitigating Cache-Based Side Channel
Attacks
Sharjeel Khan, Girish Mururu, and Santosh Pande.
[Paper]

IN-PROGRESS

ROPCraft: Automating ROP Chain Generation Through Advanced ROP Techniques
Bramwell Brizendine, Alexandra N Hussar, Shiva Shashank Kusuma, Sharjeel Khan, and Santosh Pande.

💼 WORK EXPERIENCE

GRADUATE RESEARCH ASSISTANT   AUG 2018 – PRESENT
Georgia Institute of Technology
Atlanta, Georgia
- Working with Santosh Pande on using program analysis to improve software verification techniques or solve security issues within codebases

SOFTWARE ENGINEER INTERN   MAY 2023 – AUG 2023
Google
Mountain View, California
- Worked on Android LLVM team to add order file functionality to Android Open Source Project (AOSP) and the Native Development Kit (NDK)
- Created a soong build property for order files which can be used to recompile any binary or shared library in AOSP with order files
- Tested order file optimizations on libart and saw an average startup improvement of 0.59% in 11 Android applications with 2.19% startup improvement in Chrome
- Created an order file sample and an Android developer guide to explain the process for order files in external Android apps
- Created a merging algorithm for order files based on a graph representation
- Gave a lightning talk about order files at the 2023 LLVM Developers' Meeting

PHD SOFTWARE ENGINEER INTERN   MAY 2022 – AUG 2022
Meta
Menlo Park, California

- Worked on the PoGo Stick team to improve profile-guided basic block optimizations
- Implemented four basic block hit count schemes into Meta's Android Bytecode Optimizer, Redex
- Added basic block hit count profiles into PoGo Stick's pipeline to optimize basic blocks for better performance

RESEARCH ASSISTANT   MAY 2017 – JULY 2018
Carnegie Mellon University
Doha, Qatar

- Worked on Meta-CLF project with Iliano Cervesato and Giselle Reis to develop the meta-theory for the concurrent logical framework (CLF)
- Formalized Automated Trading Systems (ATS) in Celf
- Proved properties about the formalization of ATS like no crossed/locked market

SOFTWARE ENGINEER INTERN   JAN 2017 – APR 2017
Meddy
Doha, Qatar

- Moved Transaction Emails from Django's email system to Mandrill
- Created the dashboard to show Google Analytics and Django Analytics to clinic managers
- Worked on the interface for clinics to send bulk SMS messages to their clients

🏫 TEACHING EXPERIENCE

GRADUATE TEACHING ASSISTANT
Georgia Institute of Technology

CS8803-008: Compilers - Theory and Practice	Aug 2023 - Present
CS6241: Compiler Design and Optimizations	Jan 2020 - May 2020
CS4240: Compilers & Interpreters	Aug 2019 – Dec 2019

UNDERGRADUATE TEACHING ASSISTANT
Carnegie Mellon University

36-217: Probability Theory and Random Processes	Jan 2017 - May 2017
15-210: Parallel and Sequential Data Structures and Algorithms	Jan 2017 - May 2017
21-241: Matrices and Linear Transformations	Aug 2015 - Dec 2015
15-150: Principles of Functional Programming	Aug 2015 - Dec 2015
15-122: Principles of Imperative Programming	Jan 2015 - May 2015

👔 PROFESSIONAL ACTIVITIES

INSTITUTIONAL ACTIVITIES

GEORGIA INSTITUTE OF TECHNOLOGY

SCS Graduate Student Association President	May 2022 - Apr 2023
SCS Graduate Student Association Treasurer	Jan 2021 - Apr 2022
Grad Group Leader	Aug 2019 - Dec 2023
SCS PhD Visit Day Volunteer	Feb 2019 - Feb 2023
HackGT Mentor	Nov 2018, Nov 2019

CARNEGIE MELLON UNIVERSITY

Head Orientation Counselor	Mar 2016 - Aug 2016
Orientation Counselor	Aug 2014, Aug 2015
Student Academic Committee	Jan 2016 - May 2016

🏅 AWARDS/HONORS

INTERNAL AWARDS

CARNEGIE MELLON UNIVERSITY

Undergraduate Teaching in Computer Science Appreciation Award	May 2015, May 2017
Senior Student Leadership Award	May 2017

EXTERNAL AWARDS

CARNEGIEAPPS HACKATHON

EAA Award for Humanitarian Technology	Jan 2017
Best Technical Application	Jan 2015

📇 REFERENCES

SANTOSH PANDE (ADVISOR)

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ADITIYA KUMAR

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GISELLE REIS

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ILIANO CERVESATO

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