

# Sharjeel Khan

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## 🎓 EDUCATION

### GEORGIA INSTITUTE OF TECHNOLOGY

AUG 2018 - DEC 2024

PHD IN COMPUTER SCIENCE

Thesis: A Framework for Faster Software Verification and Better Compiler Optimizations through Symbiosis

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

ASDF: A COMPILER FOR QWERTY, A BASIS-ORIENTED QUANTUM PROGRAMMING LANGUAGE

Austin J. Adams, Sharjeel Khan, Arjun Bhamra, Ryan Abusaada, Anthony M. Cabrera, Cameron Hoechst, Travis S. Humble, Jeffrey S. Young, and Thomas M. Conte.

CGO'25: ACM International Symposium on Code Generation and Optimization, Las Vegas, Nevada, 2025.

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, 2024.

[\[Paper\]](#) [\[Slides\]](#)

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

PHAEDRUS: EXPLORING DYNAMIC APPLICATION BEHAVIOR WITH LIGHTWEIGHT GENERATIVE MODELS AND LARGE-LANGUAGE MODELS

Bodhisatwa Chatterjee, Neeraj Jadhav, Sharjeel Khan, and Santosh Pande.

[\[Paper\]](#)

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.

[\[Paper\]](#)

## WORK EXPERIENCE

### SOFTWARE ENGINEER

DEC 2024 - PRESENT

GOOGLE

Mountain View, California

- Working on Android LLVM team maintaining and releasing Android's LLVM compiler for internal developers and for external developers through the Android Native Development Kits (NDKs)

### GRADUATE RESEARCH ASSISTANT

AUG 2018 – DEC 2024

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
- Published 7 conference papers and 2 journal papers

### 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-Oo8: Compilers - Theory and Practice  
CS6241: Compiler Design and Optimizations  
CS4240: Compilers & Interpreters

Aug 2023 - Dec 2024  
Jan 2020 - May 2020  
Aug 2019 - Dec 2019

### UNDERGRADUATE TEACHING ASSISTANT

CARNEGIE MELLON UNIVERSITY  
36-217: Probability Theory and Random Processes  
15-210: Parallel and Sequential Data Structures and Algorithms  
21-241: Matrices and Linear Transformations  
15-150: Principles of Functional Programming  
15-122: Principles of Imperative Programming

Jan 2017 - May 2017  
Jan 2017 - May 2017  
Aug 2015 - Dec 2015  
Aug 2015 - Dec 2015  
Jan 2015 - May 2015

## PROFESSIONAL ACTIVITIES

### CONFERENCE COMMITTEES

Artifact Evaluation Committee, PLDI

2025

### INSTITUTIONAL ACTIVITIES

GEORGIA INSTITUTE OF TECHNOLOGY  
SCS Graduate Student Association President  
SCS Graduate Student Association Treasurer  
Grad Group Leader  
SCS PhD Visit Day Volunteer  
HackGT Mentor

2022 - 2023  
2021 - 2022  
2019 - 2023  
2019 - 2023  
2018 - 2019

CARNEGIE MELLON UNIVERSITY  
Head Orientation Counselor  
Orientation Counselor  
Student Academic Committee

2016  
2014 - 2015  
2016

## AWARDS/HONORS

### INTERNAL AWARDS

GEORGIA INSTITUTE OF TECHNOLOGY  
Outstanding PhD Student in SCS

2024

CARNEGIE MELLON UNIVERSITY  
Undergraduate Teaching in Computer Science Appreciation Award  
Senior Student Leadership Award

2015, 2017  
2017

### EXTERNAL AWARDS

CARNEGIEAPPS HACKATHON  
EAA Award for Humanitarian Technology  
Best Technical Application

2017  
2015

## REFERENCES

### SANTOSH PANDE

PROFESSOR, GEORGIA INSTITUTE OF TECHNOLOGY

### PIRAMA ARUMUGA NAINAR

SOFTWARE ENGINEER, GOOGLE

### ANDREAS GAMPE

SOFTWARE ENGINEER, META

### GISELLE REIS

ASSOCIATE TEACHING PROFESSOR, CARNEGIE MELLON UNIVERSITY

### ILIANO CERVESATO

TEACHING PROFESSOR, CARNEGIE MELLON UNIVERSITY