

# Sharjeel Khan

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## 🎓 EDUCATION

### GEORGIA INSTITUTE OF TECHNOLOGY

AUG 2018 - DEC 2024

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

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

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

CS6241: Compiler Design and Optimizations

CS4240: Compilers & Interpreters

Aug 2023 - Present

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

### 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

May 2022 - Apr 2023

Jan 2021 - Apr 2022

Aug 2019 - Dec 2023

Feb 2019 - Feb 2023

Nov 2018, Nov 2019

CARNEGIE MELLON UNIVERSITY

Head Orientation Counselor

Orientation Counselor

Student Academic Committee

Mar 2016 - Aug 2016

Aug 2014, Aug 2015

Jan 2016 - May 2016

## AWARDS/HONORS

### INTERNAL AWARDS

CARNEGIE MELLON UNIVERSITY

Undergraduate Teaching in Computer Science Appreciation Award

Senior Student Leadership Award

May 2015, May 2017

May 2017

### EXTERNAL AWARDS

CARNEGIEAPPS HACKATHON

EAA Award for Humanitarian Technology

Best Technical Application

Jan 2017

Jan 2015

## REFERENCES

### SANTOSH PANDE

PROFESSOR, GEORGIA INSTITUTE OF TECHNOLOGY

santosh.pande@cc.gatech.edu

### ADITIYA KUMAR

SOFTWARE ENGINEER, GOOGLE

appujee@google.com

### ANDREAS GAMPE

SOFTWARE ENGINEER, META

agampe@fb.com

### GISELLE REIS

ASSOCIATE TEACHING PROFESSOR, CARNEGIE MELLON UNIVERSITY

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### ILIANO CERVESATO

TEACHING PROFESSOR, CARNEGIE MELLON UNIVERSITY

iliano@cmu.edu