Sharjeel Khan

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📍 Klaus Advanced Computing Building 2337, Atlanta, Georgia 30332

🎓 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

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]

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, IL, 2022.
[Paper] [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]

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

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

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
- Wrote scripts to create order files from profiles and validate them based on certain criteria
- 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

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 better optimize basic blocks for 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 personal email system to Mandrill
- Created the dashboard to show Google analytics and Django analytics to clinic managers for them to track their doctors
- Worked on the interface for clinics to send bulk SMS messages to their clients

⌨ TEACHING EXPERIENCE

GRADUATE TEACHING ASSISTANT
GEORGIA INSTITUTE OF TECHNOLOGY

CS8803-O08: Compilers - Theory and Practice	Aug 2023 - Dec 2023
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 - Present
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

</> PROJECTS

DYNAMIC DEPENDENCE GRAPH
- Built a LLVM application to create a graph showing both data dependence and control depndence
- Implemented based on approach 1 and 2 from Hiralal Agrawal and Joseph R. Horg's Dynamic Program Slicing paper
- Instrumented each function to check whether it got executed and piped it into the DG tool to create dependence graphs of only executed functions

RAPID RESPONSE
- Built a web application to provide information and place of attacks in rural countries to rescue workers
- Scraped information about attacks from social media and news websites using Beautiful Soup and Twitter's API
- Implemented using AngularJS and Django for frontend and backend respectively

KESA
- Built a web application to allow users to create and read stories with branching storylines
- Maintained the story as a D3 tree structure
- Created story sessions using PeerJS for authors to collaborate on these stories
- Implemented using AngularJS and Django for frontend and backend respectively

CONCURRENT DISTRIBUTED FILE SYSTEM

- Built a system containing multiple storage servers and the main naming server
- Implemented my own Java's Remote Method Invocation (RMI) library to allow communication between servers

SMART TEXT EDITOR

- Built a text editor web application in pure Javascript with basic functionalities
- Implemented a built-in thesaurus and Google Knowledge Base system into the editor to allow people to get information faster without leaving the editor

REFERENCES

SANTOSH PANDE (ADVISOR)

Professor, Georgia Institute of Technology
santosh.pande@cc.gatech.edu

ADITIYA KUMAR

Software Engineer, Google
appujee@google.com

ANDREAS GAMPE

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ILIANO CERVESATO

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