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

Decker: Attack Surface Reduction via On-demand Code Mapping
Chris Porter, Sharjeel Khan, and Santosh Pande.
ASPLOS'23: 28th 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: 31st 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: 36th 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: 5th International Workshop on Linearity and Trends in Linear Logic and Applications, Oxford, UK, 2018.
[Paper] [Code] [Slides]

IN PROGRESS

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

Compiler-Guided Throughput Scheduling for Many-core Machines
Girish Mururu, Sharjeel Khan, Bodhisatwa Chatterjee, Chao Chen, Chris Porter, Ada Gavrilovska, 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 machine learning and deep learning algorithms for program analysis and verification

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
- Made 21 commits to the open-source Redex repo

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 ENGINEERING 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
CS6241: Compiler Design and Optimizations — Jan 2020 - May 2020
CS4240: Compilers & Interpreters — Aug 2019 – Dec 2019

- Tutored students about material and concepts taught in the class during my office hours
- Taught during the recitations
- Answered questions on Piazza
- Graded the assignments

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

- Tutored students about material and concepts taught in the class during my office hours
- Taught during the recitations
- Answered questions on Piazza
- Graded the assignments
- Created the autograder for the coding courses on Autolab

PROFESSIONAL ACTIVITIES

INSTITUTIONAL ACTIVITIES

Georgia Institute of Technology

SCS Graduate Student Association President	May 2022 - Present
SCS Graduate Student Association Treasurer	Jan 2021 - Apr 2022
Grad Group Leader	Fall 2019 - Present
SCS PhD Visit Day Volunteer	Fall 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

SKILLS

PROGRAMMING LANGUAGES
Python, C++, Javascript, OCaml, SML, Java, C, LaTeX, Processing, SQL

FRAMEWORKS/TOOLS
LLVM, Coq, Twelf, Celf, Django, AngularJS, Foundation, Bootstrap, MySQL, Git

LIBRARIES
Numpy, Pytorch, Scikit-Learn, Pandas, Tensorflow, PeerJS, jQuery, D3,

REFERENCES

SANTOSH PANDE (ADVISOR)
Professor, Georgia Institute of Technology
santosh.pande@cc.gatech.edu

GISELLE REIS
Assistant Teaching Professor, Carnegie Mellon University
giselle@cmu.edu

ILIANO CERVESATO
Teaching Professor, Carnegie Mellon University
iliano@cmu.edu