

# Sharjeel Khan

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## 🎓 EDUCATION

### GEORGIA INSTITUTE OF TECHNOLOGY

AUG 2018 - PRESENT

PHD IN COMPUTER SCIENCE

Advisor: Dr. Santosh Pande

### CARNEGIE MELLON UNIVERSITY

AUG 2013 - MAY 2017

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

Minor in Mathematical Sciences

University Honors

Dean's List (5 semesters)

## 📄 PUBLICATIONS

### UNDER REVIEW

BISCUIT: A COMPILER ASSISTED SCHEDULER FOR DETECTING AND MITIGATING CACHE-BASED SIDE CHANNEL ATTACKS

Sharjeel Khan, Girish Mururu, and Santosh Pande.

Preprint.

### 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.

## 🧰 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
- Predicting interprocedural program paths using decision trees and sequence to sequence model
- Detecting and mitigating cache-based side channel attacks using a scheduler framework
- Improving performance of processes through scheduler-based cache partitioning using IntelCAT
- Speeding up SAT instances of Z3 solvers through parallelism and reinforcement learning

### 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

CS4240: Compilers & Interpreters

Jan 2020 - May 2020

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

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

- 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

### INTERNAL ACTIVITIES

GEORGIA INSTITUTE OF TECHNOLOGY

SCS PhD Visit Day Volunteer

Grad Groups

HackGT Mentor

Jan 2019, Mar 2020

Fall 2019, Fall 2020

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

## PROJECTS

### DYNAMIC DEPENDENCE GRAPH

- Built a LLVM application to create a graph showing both data dependence and control dependence
- 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,  $\text{\LaTeX}$ , Processing, SQL

### **FRAMEWORKS/TOOLS**

LLVM, Coq, Twelf, Celf, Django, AngularJS, Foundation, Bootstrap, MySQL, Git

### **LIBRARIES**

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