Ayush **Bansal**

FINAL YEAR UNDERGRADUATE · COMPUTER SCIENCE AND ENGINEERING

Indian Institute of Technology Kanpur

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Edu**cation**

Indian Institute of Technology Kanpur   *Kanpur, India*
BACHELOR OF TECHNOLOGY, MAJOR IN COMPUTER SCIENCE AND ENGINEERING   *July 2016 - Apr 2020*

- Cumulative Performance Index / CGPA: 9.0/10.0

Hon**ors & Awards**

2018	**Academic Excellence Award**, Academic Year 2017-2018, Amongst top 6% students of department.	*CSE, IITK*
2016	**All India Rank 187**, Joint Entrance Exam Advanced, 200,000 candidates	*India*
2016	**All India Rank 571**, Joint Entrance Exam Mains, 1.5 million candidates	*India*
2016	**All India Rank 52**, KVPY Scholarship, Indian Institute of Science and Government of India	*Bangalore, India*

Wor**k Experience**

Core Engineering, Tower Research Capital   *Gurgaon, India*
SOFTWARE DEVELOPER INTERN   *May 2019 - July 2019*

- Containerized and automated Trade Reconciliation setup to run as microservices on bare metal Kubernetes.
- Developed software in C++ to facilitate integration and regression testing of Trade Reconciliation setup by inducing "deterministic mutations" on the network stream to simulate diverse un-reconciliation scenarios.

Google Summer of Code

OPENPRINTING, THE LINUX FOUNDATION   *May 2018 - August 2018*

- Worked on the Common Print Dialog Project, developing backend to print to a file and "GTK3" adaptor backend connecting various Common Print Dialog backends installed at the time serving all available printers to the Common backend.
- The Dialog allowed access to the available printing queues such as "CUPS", "Google Cloud Print" and more via "Dbus" on the network/system.

New York Office, IIT Kanpur   *Kanpur, India*
INFRASTRUCTURE MANAGEMENT & FULL STACK DEVELOPER, SUPERVISOR PROF. MANINDRA AGRAWAL   *May 2017 - Present*

- Summer Internship continued as a volunteer and peer mentor.
- Worked on a scalable microservice based web application with an extensive technology stack.
- Deployed microservices utilizing Docker, Coreos Container Linux, ConcourseCI, JenkinsCI, and have maintained the cluster on Kubernetes.
- Configured and deployed Persistent Volume Storage System, ConcourseCI and pipelines for diverse microservices.
- Developed LeaderBoard, an Automated Ranking and Scoring System using Ruby on Rails.

Pro**jects**

InVaSion: Input Validation with Symbolic Execution   *IIT Kanpur*
RESEARCH PROJECT, PROF. SUBHAJIT ROY   *May 2018 - Nov 2018*

- Worked on forking-based symbolic execution engines to tackle the problem of Path Explosion with goal of increasing code and branch coverage for programs requiring formatted inputs such image readers or video players.
- Formulated a framework to represent the formatted input as a FSA, an input specification language (ISL) to be used by a software.
- Developed a tool in Ruby to parse and compile the ISL, and appending this ISL to the input program, generating a set of logical constraints on execution by symbolic execution engine, with the goal of guiding symbolic execution tool to produce better inputs.
- Improved branch coverage by greater than 150% on the programs in Siemens Test Suite, MiBench and Tiff library which require formatted input.

Exploiting Binaries using Return Oriented Programming   *IIT Kanpur*
UNDERGRADUATE PROJECT, PROF. DEBADATTA MISHRA   *Jan 2019 - Apr 2019*

- Worked with x86_64 binaries to invoke any particular syscall by performing static analysis and using concepts of Return Oriented Programming.
- Developed a tool for building a ROP chain from ROP gadgets to exploit the 64-bit binaries by invoking a particular syscall.

Integrating bug synthesis into a bug finding competition
UNDER PROF. BRENDAN DOLAN-GAVITT AND PROF. SUBHAJIT ROY

IIT Kanpur
June 2018 - Dec 2018

- Worked on a Bug Injection Tool "Apocalypse" used to inject bugs in C code which are difficult to locate by automated security verification tools.
- Implemented techniques for crashing the buggy C programs from Apocalypse and at the same time disguise the bugs making it difficult for users to locate.
- Injected bugs in "grep" code based on the implemented techniques and found 50% success rate in bug finding competition "Rode0day".

Certification: Issuing tamper-proof certificates
COURSE PROJECT UNDER PROF. SANDEEP SHUKLA

IIT Kanpur
Apr 2019

- A Blockchain based service issuing certificates which once issued cannot be altered by anyone, accomplished by making the certificate part of the public *Ethereum* blockchain.
- The service works on a multi-level hierarchical system in which the instructor/manager can issue certificates for the students/employees and once issued, no one can alter them and anyone in the world can verify the certificates.

PyGo: A compiler for Golang in Python
COURSE PROJECT UNDER PROF. AMEY KARKARE

IIT Kanpur
Feb 2019 - Apr 2019

- Developed a compiler from scratch in *Python* with source language as *Golang* and target as *x86_32*.
- PyGo supported all the basic features of Golang along with the advanced features such as optimizations, efficient register allocation, short circuiting, type checking and inference.

Linux From Scratch: Compiled Linux System from Source and Built a Package Manager
ASSOCIATION OF COMPUTING ACTIVITIES

IIT Kanpur
Feb 2017 - Apr 2017

- Created a "Customized Linux" based operating system by compiling all packages from scratch using the host machine's kernel.
- Built a "Package Manager" in python which fetched the dependencies of packages and created a dependency list based on packages installed.

Relevant Coursework

Discrete Mathematics	Abstract Algebra (A∗)	Data Structures and Algorithms
Computer Organization	Programming Tools and Techniques (A∗)	Probability and Statistics
Algorithms II	Operating Systems	Computer Networks
Theory of Computation	Compiler Design	Systems Security
Blockchain Technology & Application	Principles of Programming Languages (i)	Introduction to Machine Learning (i)

A∗: Grade for Exceptional Performance   *i: In progress*

Skills

Languages	C/C++, Python, Golang, Ruby, Haskell, Node.js
Web	Ruby on Rails, Javascript, TypeScript, Angular, Django
Utilities	Linux shell utilities, Git, Docker, Kubernetes, GDB, LaTeX, Vim

Extracurricular Activity

Course Tutor/Teaching Assitant DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, IIT KANPUR
July 2019 - Present

- Tutored a group of 40 students in basics of C programming, for the course "Introduction to Programming".
- Designed and grade assignments, quizzes and exams for the course of ~500 students.

Coordinator PROGRAMMING CLUB, IIT KANPUR
Mar 2018 - Feb 2019

- Organized, and set problems for various capture the flag and programming contests on campus.
- Conducted lecture series and workshops on programming topics.
- Organized the "Summer Camp" & the "Winter Camp", and mentored over 50 students in various topics who completed projects in distinct fields.

Miscellaneous

- Participated in Capture the Flag contests.
- Contributed to open source projects and maintained projects on Github.
- Administered a cloud in IIT Kanpur, deploying and managing services for the campus community.
- Enthusiastic about Systems and learning interesting stuff about Linux architecture, Programming languages, networking and security.