# Aditya **Rohan**

Junior Undergraduate · Materials Science and Engineering

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## Scholastic Achievements

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|---|---|---|
| 2016 | **All India Rank 3520,** Joint Entrance Exam Advanced, among more than 200,000 selected students | *India* |
| 2014 | **State Top 1%,** National Standard Examination in Physics, conducted by IAPT | *India* |
| 2014 | **State Top 1%,** National Standard Examination in Chemistry, conducted by ACT | *India* |

## Work Experience

### RTE - Research Track Exchange

*IIT Kanpur*

Research Project, under Prof. Kanad Basu and Prof. Ramesh Karri, NYU — *May 2018-November 2018*

- Developed new methods for malware detection using debug hardware like ARM CoreSight and Intel Platform Analysis Technology
- Designed a simulator in Python to simulate x86, x86_64 and SPARCv9 assembly instructions.
- Trained a machine learning based malware detector on these values to identify malware with upto 99.65% accuracy. Algorithms used: Random Forest, Decision Trees and kNN.
- Trained another classifier based on instruction ordering in the aforementioned architechtures to achieve upto 100% accuracy in detecting malware.
- **In proceedings** of 56th Design Automation Conference.

### IGVC - Intelligent Ground Vehicle Competition

*IIT Kanpur*

Team Member, under Prof. Mangal Kothari — *Sept. 2017-May 2018*

- Designed Lane Detection Algorithm for Autonomous Ground Vehicle based on structure and color of elements present in video feed in real time to navigate unknown terrains according to the problem statement.
- Implemented and highly modified GPU accelerated gSLICr segmentation algorithm for identifying white lanes on a golf course.
- Applied neural nets(in C++) and algorithms such as Random Forest for grass elimination and extracted the lanes using Hough Transform and converted it into top view using Inverse Perspective Transform and birds eye node, finally passing to the mapping node.
- Placed 5th in the Design Competition and 12th Overall in Michigan, USA.

### New York Office, IIT Kanpur

*Kanpur, India*

Infrastructure Management, under Prof. Manindra Agarwal — *May. 2017 - Present*

- Served as a team lead of 3 interns in infrastructure group, continued as a volunteer and peer mentor.
- Deployed various containerized applications over a Kubernetes cluster with nodes spread across multiple datacenters.
- Worked on a scalable web application with an extensive technology stack and implemented an OAuth2 based sign-in system for the web application, via Github.
- Deployed notifications in Phabricator using the Aphlict server and terminated the SSL on Nginx, sent websocket traffic to the same port as normal HTTP traffic and used nginx to proxy it selectively based on the request path.
- Created a Finger-Print based attendance system in python to be used during the internship. Used and learned about minutae matching algorithms such as Bozorth and Mindtct.

## Projects

### Course Project - Secure Memory Systems

*IIT Kanpur*

Research Project, under Prof. Biswabandan Panda — *July 2018-November 2018*

- Mounted a side-channel attack through the shared translation lookaside buffer to extract 256-bit EdDSA secret keys and RSA keys without privileged access.
- Reverse engineered the microarchitecture of TLB to find set and way associativty of vairous levels of TLB and their sharedness properties
- Developed pointer-chasing strategies to monitor latency of eviction sets from various levels of TLB.
- Mounted Flush-Reload, Prime-Probe, and other side-channel attacks on current processors

### GemOS - Operating Systems

*IIT Kanpur*

Course Project, under Prof. Debadatta Mishra — *July 2018-November 2018*

- Implemented Multi-level paging, signals like SIGINT, SIGSEGV and SIGFPE and exception handlers like page-faults and divide-by-zero.
- Added system calls like expand, shrink, write, sleep, clone etc and implemented process scheduling with round-robin scheduling policy in GemOS.
- Designed a scalable filesystem for GemOS.

## Relevant Courses

Secure Memory Systems
Computer Systems Security($i$)
Computer Networks($i$)
Introduction to Programming
Operating Systems
Topics in Operating Systems($i$)
Computer Organization
Computer Architecture($i$)
Blockchain Technology and Application($i$)
Data Structures and Algorithms

*$i$: In progress*

## Skills

**Programming** C/C++, Python, Assembly Language Programming, MATLAB/GNU Octave
**Operating Systems** Ubuntu, Arch Linux, Linux Mint, CentOS, MacOS
**Utilities** Linux shell utilities, Git, Docker, Kubernetes, LaTeX, Vim, ROS, OpenCV, Morse, Gem5, Keras

## Positions of Responsibility

- **Manager, Software Corner, Techkriti'18:** Created and tested problems for IOPC (International Online Programming Contest), which witnessed participants from more than 20 countries, competing for prizes worth 1.5 Lakh rupees
- **Academic Mentor, Couinselling Service:** Took lectures for the more than 350 students for the course Introduction to Programming(ESC101)
- **Student Guide, Counselling Service:** Helped in conducting orientation for 850 students, with 6 peer mentee

## Interests

- Systems Security
- Computer Architechture and Design
- Machine Learning Applications in Systems and Cyber Security
- Robotics