Saksham **Sharma**

Final Year Undergraduate · Computer Science and Engineering

Indian Institute of Technology Kanpur

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Education

Indian Institute of Technology Kanpur *Kanpur, India*

Bachelor of Technology, major in Computer Science and Engineering *2014 - 2018 (Expected)*

- Institute Rank 1 among 830 students. Cumulative Grade Point / **CGPA: 10.0/10.0**

Honors & Awards

2015 **Academic Excellence Award**, Institute Rank 1 *IIT Kanpur*

2014 **Aditya Birla Group Scholarship Awardee**, Among 15 top students from all IITs *Mumbai, India*

2014 **All India Rank 10**, Joint Entrance Exam Mains, 1.5 million candidates *India*

2014 **All India Rank 138**, Joint Entrance Exam Advanced, 150,000 candidates *India*

2014 **Merit Certificate Awardee, Overall 97.6%**, Grade 12 national examination *India*

2013 **KVPY Scholarship Awardee**, Indian Institute of Science and Government of India *Bangalore, India*

2010 **NTSE Scholarship Awardee**, Government of India *India*

Work Experience

Software Engineering Intern, Google Seattle *Seattle, WA*

GKE/Kubernetes Security Team *May. 2017 - Jul. 2017*

- Worked on Kubernetes, Google Cloud's open source Docker container orchestration platform, to encrypt resources in cluster database at rest, a feature requested by industry for security hardening.
- Implemented envelope encryption using Key-Encryption-Keys and Data-Encryption-Keys to lower latency.
- Designed a method for allowing key rotations in a distrubted system with a shared database.
- Feature released as alpha in v1.7, integration with Google's Key Management System on track for v1.8.
- Collaborated with engineers across companies for designing the feature.

Max Planck Institute for Software Systems *Saarbrücken, Germany*

research Fellow, under Dr. Eva Darulová *May. 2016 - Jul. 2016*

- Developed and evaluated a Scala tool to rewrite mathematical floating-point expressions and increase their accuracy using a genetic algorithm.
- Obtained successful results, improving expression errors by $\sim 50\%$, for scientific and embedded applications.
- Part of a larger tool for optimizing numeric expressions, will hopefully appear in publication soon.

New York Office, IIT Kanpur *Kanpur, India*

Full Stack Developer, under Prof. Manindra Agarwal *May. 2015 - Apr. 2016*

- Adjudged as one of the best interns, while being a freshman
- Worked on a scalable application in a polyglot environment with an extensive technology stack.
- Designed and implemented the full search component (using ElasticSearch)
- Implemented code evaluation, attachment support and front-end functionality.
- Technology used: Scala with Akka, Node.js with Express, Angular with TypeScript, ElasticSearch

Projects

Tipsy: Tool to provide tips and corrections for MOOC submissions *IIT Kanpur*

Undergraduate Project, Prof. Amey Karkare *Jan. 2017 - Apr. 2017*

- Created a tool in Scala to parse, analyze and classify C programs from large programming courses, to help provide suggestions and tips to weak students.
- Reduced C programs to a linear high level representation, which was later used for finding shortest distance between 2 programs.
- Classified programs to provide suggestions to students based on programs similiar to their submission.

Amigo: A 4-stage x64 Compiler for Golang *IIT Kanpur*

Course Project, Prof. Amey Karkare *Jan. 2017 - Apr. 2017*

- Implemented a compiler for a fully functional subset of the Go language, in C++ and Python.
- Used flex and bison to obtain an AST, which is later translated to a x64 assembly.
- Implemented pointers, multiple return values, deeply nested arrays, among other features; along with some low level optimizations.

Anonymous and private pair matching platform acehack.org/puppy *IIT Kanpur*

Course Project, Prof. Piyush Kurur and Prof. Satyadev Nandakumar *Nov. 2016 - Feb. 2017*

- Designed and implemented an algorithmic platform for anonymous pair/couple matching.
- Ensures that users' choices are not made known even to the server admin.
- Used Diffie-Hellman like token exchange over an honest-but-curious server backend, asymmetric encryption to ensure confidentiality and fairness even during matching.

moVi: Mobile Video Chat Protocol github.com/netsecIITK/movi *IIT Kanpur*

Undergraduate Project, Prof. Sandeep Shukla *Sept. 2016 - Nov. 2016*

- Developed a client for video communication akin to Mosh (mobile shell).
- Used UDP to set up a connection-less and secure channel, persistent across network IP and location changes.
- Implemented State Synchronization Protocol, UDP Hole Punching, and dynamic tweaking of video quality.

ABU Robocon 2015, Badminton playing robots *IIT Kanpur*

Member, Team Robocon IIT Kanpur, Prof. Bhaskardas Gupta *Oct. 2014 - Mar. 2015*

- Programmed and built 2 semi-autonomous robots capable of playing badminton on a standard size court.
- Used image processing with OpenCV to detect the shuttle and predict the trajectory.
- Used Kinect and Stereo Vision to get depth of field. Programmed the robot using Arduino run by Odroid.
- Finished 11th among 85 teams all over India.

Extracurricular Activity

Coordinator Programming Club, Information Security Group *Apr. 2016 - Apr. 2017*

- Rewrote, deployed, populated club website pclub.in
- Organize and conduct workshops, lectures on programming topics.
- Set problems for and organize various programming contests, capture the flag contests on campus.

Software Corner Manager Techkriti 2016, IIT Kanpur's National Technical Fest *Dec. 2015 - Mar. 2016*

- Made an esoteric language based on turing machines for a national competition.
- Wrote an online judge for a High Performance Computing contest run on the Param YUVA II supercomputer.

Microsoft code.fun.do hackathon Consecutive two time hackathon winner *Jan. 2015, Sept. 2015*

- An application to parse and plot graphs of implicit mathematical functions using C#, for Windows Phone.
- A platform to learn coding for Windows Phone, with a custom online judge written in Node.js.

Skills

Programming C/C++, Python, Node.js, Golang, Scala

Web Express.js with Node.js, Akka with Scala, JavaScript, TypeScript, Angular

Utilities Linux shell utilities, Git, Docker, Kubernetes, GDB, ElasticSearch, LaTeX, Emacs and Vim

Relevant Coursework

A∗	Computer Networks	A∗	Operating Systems	A∗	Compiler Design
A∗	Computer Organization	A∗	Modern Cryptology	A∗	Algorithms
A∗	Introduction to Programming	A	Computer Architecture	A	Computer Systems Security

A∗: Grade for exceptional performance *A: grade*

Miscellaneous

- Contribute to open source, maintain some well appreciated projects on Github
- Microsoft Build The Shield 2016, National 10th in final, on-site Capture The Flag contest.
- Administer a cloud in IIT Kanpur, deploying and managing services for the campus community.