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 Performance Index / **CGPA: 10.0/10.0**

Honors & Awards

2015	**Academic Excellence Award**, Institute Rank 1 with a GPA of 10/10 in all semesters	*IIT Kanpur*
2014	**Aditya Birla Group Scholarship Awardee**, Awarded to 15 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

GKE/Kubernetes Security, Google Seattle — *Seattle, WA*

Software Engineering Intern — *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 allow using remote cloud-based Key Management Services.
- Designed a method for allowing key rotations in a distributed 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 ~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 C programs en masse — *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. Used it to find similar features between programs, thus allowing discovering corrections in a program using reference programs.
- Classified programs to provide suggestions to students based on programs similiar to their submission.

Anonymous and private couple matching platform
IIT Kanpur

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

- Designed an algorithm and implemented a 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, along with asymmetric encryption, to ensure confidentiality and fairness even while matching people.

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.

moVi: Mobile Video Chat Protocol
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, and Ordroid to control the robot's movements.
- Finished 11th among 85 teams all over India.

Extracurricular Activity

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

- Rewrote, deployed and populated the club website at pclub.in
- Organized and conducted workshops and lectures on programming topics.
- Set problems for, and organized various programming and 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++, Scala, Golang, Python, Node.js

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.