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Kunal Kapila

Bachelor of Science
Mathematics and Scientific Computing

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Education

- **Indian Institute of Technology, Kanpur** *2014 - 2018 (Expected)*
  Cumulative Grade Point Average 9.2/10
  Department rank 2 *(Among 51 students)*
- **All India Senior School Certificate Examination (AISSCE)**
  Central Board of Secondary Education (CBSE), Govt. of India; Delhi Public School, R. K. Puram
  - 98.2%; School Topper; National top 1% in Physics, Chemistry and Computer Science *2014*
  - Cumulative Grade Point Average (CGPA) 10/10 *2012*

Academic and Co-Curricular Achievements

- All India Rank 1306 in **JEE Advanced** 2014 among 150,000 candidates
- All India Rank 116 in **JEE Mains** 2014 among 1.5 million candidates
- **Kishore Vaigyanik Protsahan Yojna** Fellow 2013, Dept. of Science & Technology, Govt. of India
- Awarded **Gold Medal** by school for excellence in academics and Computer Programming
- **Junior Science Talent Search Examination** Scholar 2012, Directorate of Education, Govt. of Delhi
- **National Talent Search Examination** Scholar 2010, conducted by NCERT, Govt. of India
- Rank 29 & 54 in ACM-ICPC Amritapuri Onsite & Online Round 2015 respectively among 1500 teams
- **Microsoft Code.Fun.Do**
  - **Winner 2014-15**: Graphing app to plot implicit 2D Mathematical Functions for Windows Phone
  - **National 5^{th}, Coding Milestone, Finalist Forum 2014-15**: Educational app to teach students programming on the go for Windows Phone; Implemented Scratchpad and Daily Challenges
  - **Winner 2015-16**: Front-end for open source program simulation code for Microsoft Windows
- Represented India at **Asia Pacific Informatics Olympiad (APIO)** 2014
- Qualified for & Attended **International Olympiad of Informatics Training Camp** 2014, a camp for which 26 students were selected nation-wide, to select the team that represented India at IOI 2014
- **Winner, Freshers' Programming Contest** 2014-15, IIT Kanpur
- Qualified for **Indian National Mathematical Olympiad**, 2013

Technical Skills

- **Languages**: C (*Proficient*), C++ (*Expert*), Python (*Expert*)
- **Web Development**: HTML, CSS, Javascript, PHP, Node.js (with Express, Restify)
- **Tools**: LaTeX, Git, Vim, OpenGL, SDL, GDB, MATLAB, Visual Studio

Fields of Interest

- Algorithms and Theory
- Cryptology
- Number Theory
- Quantum Computing

Work Experience and Projects

- Co-authored a research paper "**A Succinct Data Structure for Dynamic Queries**" *JAN 2015*
  Paper currently under revision. Click here for the overview
  - Proposed a new data structure "SegBit" to process queries like RMQ, RSQ and Stabbing Query
  - Iterative; Lower constant of complexity; Performs better than Segment Trees
- **Cimulator**: a Visual & Interactive Tutoring system *Click here for **Tutorial*** *MAY-JUL 2015*
  Supervisor: Prof. Amey Karkare, Dept. of CSE, IIT Kanpur *Tested by* 400 *students in Fall* 2015
  - Interpreter for C language in python, modelled memory artificially, handled external header files
  - Prompts user with corrections for runtime errors instead of crashing abruptly (unlike gcc)
  - Web interface to **simulate C codes** interpreted by Cimulator to provide visual cues to the user
- **Animation project:** Graphics Course project *OCT-NOV 2015*
  Supervisor: Prof. Vinay P. Namboodari, Dept. of CSE, IIT Kanpur
  - Rendered 3-min movie clip using **OpenGL** (Graphics Library), **SDL** (Simple DirectMedia Layer)
  - Implemented Keyframe animation, DeBoor's B-Spline Interpolation, Texture Mapping, Lighting, Physics-based collision detection, Dynamic Programming and integrated audio
- Web Developer (Intern), **Elanic**, Bangalore *DEC 2015*
  - Full stack developer: MongoDB, AngularJS and NodeJS with Restify framework
  - Built REST APIs for notification, engagement and search (using Elastic Search) modules
- **Randomness Certification & Generation using Quantum Non-Locality** *FEB 2016-current*
  Supervisor: Prof. Rajat Mittal, Dept. of CSE, IIT Kanpur
  - Understand Quantum non-locality (Bell inequalities, Hardy's Paradox and non local games), and using this read randomness certification, and a protocol to generate random strings of numbers
  - Click **here** to view the preliminary project report
- **Students' Gymkhana Form Automation** *MAR 2016-current*
  Supervisor: Prof. Sumit Ganguly, Dept. of CSE, IIT Kanpur
  - Automate two commonly used Students' Gymkhana forms: Senator Seed Fund & LHC booking
  - Click **here** to view the preliminary project report

Relevant Courses

Mathematics	Mathematics I (Functional Analysis)	Mathematics II (Linear Algebra)
	Abstract Algebra	Real Analysis
	Probability & Statistics*	Mathematical Logic*
Computer Science	Fundamentals of Computing (A*)	Data Structures and Algorithms (A*)
	Modern Cryptology*	Quantum Computing*
	Principles of Database Systems*	Introduction to Computer Graphics

(A*) Awarded for exceptional performance (*) Courses in Progress

Positions of Responsibility

- **Student Member, Senate Undergraduate Committee**, IIT Kanpur *(2014-15) & (2015-16)*
  - Among **4** student members responsible for representing the opinions of undergraduate students (more than 3500) on academic matters
  - Worked on proposals like remedial programme for academically deficient students, Undergraduate TAs, Minor in 3^{rd} department for Double Major Students, Lateral Entry for Bachelors programme in Physics, Chemistry and Mathematics, Semester drop for any valid reason
- **Senator, Students' Gymkhana**, IIT Kanpur *(2015-16)*
  - Among **6 elected** representatives of UG Y14 batch (800 students) to the Students' Senate
  - Responsible for attending the meeting of the Students' Senate, IIT Kanpur, the highest policy-making and legislative body of the Students' Gymkhana, IIT Kanpur