Sandesh Kalantre
Engineering Physics
Indian Institute of Technology Bombay

140260012
UG Second Year
Male
DOB: 08/06/1996

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2016	9.81
Intermediate/+2	Maharashtra Board (HSSC)	S. P. College	2014	94.31
Matriculation	Maharashtra Board (SSC)	Dyanmata High School	2012	97.82

Homepage: `home.iitb.ac.in/~sandeshkalantre`
Pursuing a Minor in Computer Science and Honours in Physics

Academic Achievements

2015 Ranked **2nd** in the Department and overall **11th** in the Institute (in a batch of 880)

2011 **Gold Medal** at the 16^{th} International Astronomy Olympiad, Almaty, Kazakhastan and **ranked** 1^{st} **among participants from 21 countries**

2012 **Gold Medal** at the 6^{th} International Olympiad on Astronomy and Astrophysics, Rio de Janerio, Brazil and ranked 18^{th} among participants from 28 countries

2013 **Silver Medal** at the 7^{th} International Olympiad on Astronomy and Astrophysics, Volos, Greece

2013 **Gold Medal** and Certificate of Merit in **Indian National Physics Olympiad (2013)** for being among national top 35 out of $\approx$ 10000 students

2014 Awarded an **AP** grade (given only to top 1%) for exceptional performance in PH107 Quantum Physics and Application, CH107 Physical Chemistry, CS101 Computer Programming and Utilization and EE112 Introduction to Electronics at IIT Bombay

2015 **Institute Academic Award (2014-2015)**, IIT Bombay

2011 **Gold Medal** in the prestigious Homi Bhabha Young Scientist Examination

2009-2010 **All India Rank 4** in 4^{th} International Mathematics Olympiad and $12th$ National Science Olympiad

Scholarships

2013 Kishore Vigyan Protsahan Yojana(**KVPY**) awarded by Department of Science and Technology, India for promotion of basic sciences among high school students to $\approx$ 250 students in the country

2010 National Talent Search Scholarship(**NTSE**) awarded by the National Council for Educational Research and Training to $\approx$ 1000 students in the country

2011-2013 Infosys Award for International Olympiad medalists by HBCSE in association with the Infosys Foundation and TIFR Endowment Fund

2012 Amul Vidya Shree Award for excelling in Secondary School Certificate(SSC) Examination, 2012

Academic Projects

August 2015 **Quantum Teleportation with *indirect* Bell measurements in NV centres**,
Prof. Bhaskaran Muralidharan, IIT Bombay.

- Studied the use of **indirect** Bell measurements of NV spin and ^{15}N nuclear spin to accomplish teleportation of quantum states
- Working on designing a simulation to reproduce the teleportation scheme with indirect Bell measurements

June 2015 **Quantum Algorithms and Information**,
Prof. P. K. Panigrahi, IISER Kolkata.

- Applied Grover's Search algorithm to search for the existence of an Eulerian circuit in a graph given the adjacency list representation
- Worked on Counterfactual Cryptography using Noh's protocol for designing quantum digital signature schemes
- This project was supported under the **National Initiative on Undergraduate Science (NIUS)** Programme in Physics which is awarded to **top 20 students in the country**.

December 2014 **Pulsar Observatory for Students (POS) - 2014**,
K. Krishnakumar, Radio Astronomy Centre, Ooty.

- Studied the operation of the Ooty Radio Telescope (ORT),a 530-metre (1,740 ft) long and 30-metre (98 ft) wide Cylindrical Paraboloid telescope
- Collected raw time-series data for pulsars using the ORT and processed data was used to explore various properties such as the Dispersion Measure(DM) and Pulse broadening due to interstellar scattering

Autumn 2014 **NumCpp - mathematical library in C++**,
Prof. D. B. Pathak, IIT Bombay.

- Wrote a stack based parser using Djitstra's shunting yard algorithm to parse function definitions as well as mathematical equations
- Implemented routines for numerical computations such as Integration, Root finding and FFT with *arbitrary precision support* using the GNU MPFR Library

Work Experience

Autumn 2015 **Teaching Assistant**,
PH107 - Quantum Physics and Application, IIT Bombay.

- Mentoring a batch of around 50 students in the course content
- Involved in evaluation of exams and quizzes

May 2015 **Resource Person**,
Indian National Astronomy Olympiad Programme, HBCSE - TIFR, Mumbai.

- Involved in generation of problems for selection of the Indian Team to the International Olympiad on Astronomy and Astrophysics (IOAA)
- The team was awarded **3 Gold & 2 Silver medals** (2015), which was India's best result in 9 years.

July 2015 **IPhorum**,
Browser Application for International Physics Olympiad, 2015, Mumbai.

- Worked in a team of 2 in development of IPhorum - a browser based application for tasks such as voting, translation upload and feedback submission among *approx* 100 users
- Used *Node.js* as the server application and Mongodb as the primary database

2015-2016 **Convener**,
Maths and Physics Club, IIT Bombay.

- Organisation of events fostering to the enthusiasm of students in Physics and Mathematics catering to around **400-500** students on campus and having an outreach of around **4000** online
- Worked on designing a **Homopolar Motor** for demonstration to freshmen

Computer skills

Programming	C, C++, Fortran, Python, Haskell, HTML, CSS, Javascript, Perl, bash
Science Packages	NumPy, SciPy, Matplotlib, Astropy, gnuplot, Octave, SPICE Circuit Simulation, GNU GMP/MPFR library
Softwares	LaTeX, Git, InkScape, AutoCad, Pelican, Node.js, Wireshark

Key Courses

Physics	Classical Mechanics*, Special Relativity*, Non-Linear Dynamics*, Quantum Physics and Applications, Electricity and Magnetism, Physics lab
Mathematics	Complex Analysis*, Differential Equations*, Linear Algebra
Others	Computer Networks*, Electronics, Computer Programming and Utilization

(* courses are will be completed by end of Autumn 2015)

Extra-curricular activities

- Built a Kelvin Water Dropper and demonstrated build-up of a potential difference under Maths and Physics club, IIT Bombay
- Secured 2^{nd} position in the Bazinga Physics Quiz organised by Maths and Physics club, IIT Bombay
- Interested in abstract mathematics, teaching, literature, history and mythology
- Associated with National Service Scheme, IIT Bombay under Educational Outreach program
- Secured first prize in Debate competition held at Dynamata High School, Amravati, Maharashtra