

# Sagnik Bhattacharya | CV

+91 9883209069 • sagnikb@iitk.ac.in  
Junior Undergraduate, D-342, Hall-2, IIT Kanpur, India

## Education

<b>B.Tech., Electrical Engineering with Minor in Quantum Mechanics</b> <i>IIT Kanpur</i>	<b>8.9/10.0</b> <i>(Expected) 2019</i>
<b>Class XII, All India Senior School Certificate Examination (AISSCE)</b> <i>Apeejay School, Park Street, Kolkata</i>	<b>96.6%</b> <i>2015</i>
<b>Class X, CBSE Board Certification Examination</b> <i>Apeejay School, Park Street, Kolkata</i>	<b>10.0/10.0</b> <i>2013</i>

## Research Interests

•Quantum Computing                      •Information Theory                      •Quantum Algorithms and Complexity

## Projects

**The Resource Theory of Quantum Information:** *Aug - Nov 2017*

*Course project for CS682 - Quantum Computing under Prof. Rajat Mittal, IIT Kanpur*

- Read the book *From Classical to Quantum Shannon Theory* by Mark Wilde for an introduction to classical and quantum information theory, supplemented by *Cover and Thomas* as a reference.
- Read the paper *A Resource Framework for Quantum Shannon Theory* by Devetak, Harrow and Winter.
- Presented an introduction to density matrices and quantum channels in the mid-term presentation. [SLIDES]
- Presented an introduction to unit quantum protocols in the end-term presentation. [SLIDES]
- Final project report on unit quantum protocols, quantum channels and typicality can be found [HERE].

**Models of Language Acquisition and Evolution:** *May - Jul 2017*

*Course project for PSY499 - Psychology of Language under Prof. Ark Verma, IIT Kanpur*

- Read papers by Nowak, Niyogi, Komarova, Chomsky *et al* on *computational models of language acquisition*
- Read papers by Nowak on *evolutionary dynamics of language change* and presented a survey in a talk [SLIDES]
- Mainly learned about non-linear dynamics and automata theory as applied to linguistics and language dynamics

**N-Body Simulation by Parallel Programming:** *May - Jul 2016*

*Summer project under Programming Club, IIT Kanpur*

- Used *OpenACC* to parallelize C code and achieve speed-ups of the simulation of the N-Body Problem.
- Used *gnuplot* to show a *simulation of the N-body problem* based on entry of initial mass, position and velocity data of the bodies to be simulated <https://sagnikb.github.io/Simulati-0N/>

## Academic Achievements

**Academic Excellence Award 2017:** Awarded by Indian Institute of Technology, Kanpur based on academic performance over the previous academic year

**JEE Advanced 2015:** Secured All India Rank 1192 in JEE Advanced 2015 (out of 1,50,000 participants)

**NSEP 2015:** Among top 10% in National Standard Examination in Physics (NSEP) conducted by IAPT. Qualified for both Indian National Physics Olympiad (INPhO) and Indian National Chemistry Olympiad

**Vikram Memorial Award 2015:** by Apeejay School, Park Street, Kolkata for scoring the highest in AISSCE (All India Senior School Certificate Examination - Class 12) in the school

**KVPY National Fellowship 2014:** A National Science Fellowship Program funded by the Department of Science and Technology, Government of India

**National Science Talent Search Examination (NSTSE) 2012:** Organized by Unified Council, National Rank 7

**National Talent Search Examination (NTSE) 2011:** Organized by NCERT, Govt. of India, secured National Rank 114

## Relevant Courses

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### Department of Computer Science - IIT Kanpur

- Quantum Computing
- Data Structures and Algorithms

### Department of Electrical Engineering - IIT Kanpur

- Signals, Systems, and Networks
- Principles of Communication
- Communication Systems ‡
- Mathematical Structures of Signals and Systems ‡

### Department of Physics - IIT Kanpur

- Introduction to Quantum Physics
- Coherence and Quantum Entanglement

### Department of Mathematics - IIT Kanpur

- Linear Algebra and ODE
- Complex Analysis
- Probability and Statistics
- Abstract Algebra‡

‡ - Next Semester Courses

## Technical skills

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**Programming:** C/C++, Python, Bash

**Technical Tools:** L<sup>A</sup>T<sub>E</sub>X, GNUPlot, Git, SolidWorks, ANSYS, Octave, Matlab, Mathematica

**Web-Dev:** HTML, CSS, Jekyll

## Extra-Curricular Activities

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### Science Coffeehouse

- Currently one of the Leaders of the Science Coffeehouse, IITK, where discussions and talks are held on a wide number of scientific topics, for the current academic year 2017-18.
- Organized regular meetings with talks on various scientific topics
- Organized and conducted four events during Takneek 2017, an intra-college science and technology competitions. Questions and solutions I made for one of the events can be found [[HERE](#)].

### Counselling Service IIT Kanpur

- Selected as Academic Mentor (2016-17) Helped first year students who faced problems in the course PHY103 - Introduction to Electromagnetism, was involved in both one-to-one mentoring and taking remedial classes
- Selected as Student Guide (2016-17) Helped newly joined first year students to get used to campus life and to quickly adjust to campus culture

### Quizzing

- Won Sports Quiz, Freshers' Inferno, IITK 2015
- Reached national semi-finals of ESPN Sports Quiz 2012
- Won regional and national finals in Quizomania (organized by The Times of India). 2011

**Blogging** I blog sporadically at *Thoughts*, *Quantized*, link [[HERE](#)]

**Shannon Centenary Day (2016)** An event that was part of the Shannon centenary celebrations of the IEEE Information Theory Society. Attended several talks on Information theory.