

Amey Gaikwad

Indian Institute of Technology- Bombay

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Research Interests

I am passionate about Theoretical Physics, Mathematical Physics and the mathematics behind the complex physical phenomena present. I also like Astrophysics and Theoretical computer science.

Education

- 2015-present **Indian Institute of Technology - Bombay, Mumbai.**
B.Tech in Engineering Physics, Minor in Mathematics, *CPI* - **9.91/10.0**.
Ranked 1st in the Physics Department and among the top 10 in the Institute.
- 2013-2015 **Intermediate/+2, Pace Junior Science College, Nerul, Percentage - 94.95.**
Topper in Maharashtra Board in **Physics** (100/100) and **Electrical Maintenance** (200/200)
- 2013 **Matriculation, Ryan International School, Kharghar, Percentage - 96.7.**

Research Internship

- December 2016 **National Program on Differential Equations(NPDE)-Multistability of planar bistable liquid crystals.**
Prof. Neela Nataraj, Department of Mathematics, IIT Bombay

- Under the Landau-de Gennes free energy framework, analysed what drives the normal bistable liquid crystals into multistability.
- Successfully modelled the energy functionals in order to minimize them to find the stable states of the multistable liquid crystal.
- Applied numerical techniques (Finite Elements Method and the Newton Galerkin approximation) for carrying out the minimization of the energy functional.
- These numerical calculations were done on MATLAB along with the L2 errors which showed an expected decrease as the number of iterations increased.
- Report: <https://github.com/ameypg16/NPDE-Final-D1/blob/master/Science.pdf>

Course Projects

- Autumn 2016 **Chaos in Cryptography.**
PH 542 - Non Linear Dynamics

- Analysed the topological similarities between the two seemingly different fields of cryptography and chaos theory.
- Developed algorithms in Python for constructing chaotic maps to be used for demonstrating

cryptography.

- The Baptista algorithm was implemented and chaotic maps were developed on the basis of the logistic map and Lorenzs' dynamical model.
- Results, advantages and disadvantages were analysed from a theoretical and practical perspective.

Autumn **Analysis of specific problems in Data Analysis.**

2016 *EP 219 - Data Analysis and Interpretation*

- Developed algorithms in Python for Data analytical problems from theoretical and experimental physics.
- Pyplot, SciPy, NumPy and Matplotlib were used for plotting the data and inferring the results.
- A report was submitted for the weekly assignments consisting of the data and the inferences made out of the problem for the week.

Spring **Electronics project.**

2015 *EE 112 - Introduction to Electronics*

- Modelled a **quiz buzzer circuit**.
- Learned the use and applications of analog and digital circuits.

Autumn **Hotel Management System.**

2015 *CS 101 - Introduction to Programming*

- Using the basic techniques of computer programming developed a monolithic algorithm for a Hotel Management System.
- Developed methods to make the program as robust and error free as possible.

Autumn **3D Project.**

2015 *ME 119 - Engineering Drawing*

- Designed motorboat using **Solidworks and AutoCAD**.
- Efforts were made to make the motorboat as aerodynamically efficient as possible.

Academic Achievements

2015 **Awarded the Institute Academic Prize** by IIT Bombay for the year 2015-2016 (**3rd in the Institute - CPI-9.94**)

2015 Secured an **SPI of 10.0** in the first semester

2015 Awarded **AP** grade in Calculus

2015-2016 **Department Rank 1** in the Physics Department

2015 Topper in Maharashtra Board in **Physics** (100/100) and **Electrical Maintenance** (200/200)

2015 Offered admissions in **CMI, ISI, and IISc**

2014-2015 Qualified in **National Top 1% in NSEP**

2014-2015 Qualified in **National Top 1% in NSEA**

Scholarships

- 2015 Awarded eligibility for **INSPIRE Scholarship** (by qualifying within top 1% of Maharashtra board at class XII – March 2015)
- 2013 Kishore Vigyan Protsahan Yojana (**KVPY**) awarded by Department of Science and Technology, India for promotion of basic sciences among high school students.
- 2011-2012 National Talent Search Scholarship **NTSE** awarded by the National Council for Educational Research and Training.

Positions Of Responsibility

None Yet

Computer Skills

Programming C++, Python, Java

Science Packages Numpy, Scipy, Matplotlib, MATLAB, Octave

Softwares \LaTeX , Git, Solidworks, AutoCAD

Key Courses

Physics Non Linear Dynamics, Theory of Special Relativity, Classical Mechanics, Introduction to Quantum Mechanics, Electromagnetism, Data Analysis and Interpretation, Thermal Physics

Mathematics Calculus, Linear Algebra, Differential Equations-I&II, Complex Analysis, Real Analysis

Others Introduction to Electronics