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, Cosmology, Particle Physics 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)-Multistablity 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.
- Project Presentation: https://github.com/ameypg16/Resume/blob/master/NLDproject.pdf

Autumn 2016 **Analysis of specific problems in Data Analysis**.
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 2015 **Electronics project**.
EE 112 - Introduction to Electronics

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

Autumn 2015 **Hotel Management System**.
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 2015 **3D Project**.
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, Mathematica
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