



Amey Prashant Gaikwad
Engineering Physics
Indian Institute of Technology Bombay

15D260002
UG Third Year (B.Tech.)
Male
DOB: 21/10/1997

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2018	9.78
Intermediate/+2	MUMBAI UNIVERSITY	PACE JUNIOR SCIENCE COLLEGE , NERUL	2015	94.92
Matriculation	ICSE, Delhi	RYAN INTERNATIONAL SCHOOL , KHARGHAR	2013	96.70

FIELDS OF INTEREST

- Quantum field theory, Conformal Bootstrap, String Theory, Holography, Theoretical Condensed Matter Physics, Black Hole Physics

TECHNICAL SKILLS

- Languages** : C++, Java, Python, VHDL
- Tools** : Mathematica, \LaTeX , OriginPro, MATLAB, Gravitpy, Numpy, Scipy, Arduino, FPGA
- Key Courses**: Special and General Relativity, Classical and Quantum Mechanics, General Topology, Differential equations, Real, Complex and Numerical Analysis, Basic Algebra , Group theory Methods in Physics , Relativistic Quantum mechanics and Quantum Field Theory, Elementary Particle Physics (Ongoing), Theoretical Condensed Matter Physics(Ongoing), Condensed Matter Physics (Ongoing), Statistical Physics(Ongoing)

RESEARCH PROJECTS

- Conformal Bootstrap** (Research Project)
(Guide: Dr. Shiraz Minwalla (TIFR - Department of Theoretical Physics)Spring 2018 - Ongoing)
 - Conformal Invariance, Radial Quantization, COnformal Block expansion
 - Bootstrap Philosophy, Introduction to the 3D Ising CFT
- Quantum Field Theory** (EP 322 Supervised Learning Project)
(Guide: Dr. R. Loganayagam (ICTS-TIFR - String Group) and Coguide: P. Ramadevi (Department of Physics , IITB) , Autumn 2017-2018)
 - Path Integral Formulation of Quantum Mechanics,Zero and one dimensional quantum field theory.
 - Schwinger Dyson equation, Perturbation Theory, Symmetry factors and Feynmann Diagrams.
 - Scattering matrix through the path integral formalism.
 - Basics of Grassmanian algebra, and representation of Lorentz group.
 - Report: <https://github.com/ameypg16/Reports/blob/master/SLP-QFT-Report.pdf>
- Instantons, Monopoles and Solitons in Non Abelian Gauge theories** (ICTS SN Bhatt Memorial Excellence Fellowship Program)
(Guide: Dr. Pallab Basu (ICTS-TIFR - String Group) , Summer 2017)
 - Confinement: Instantons, solitons and monopoles in Non Abelian gauge theories.
 - Instantons of the double well potential and in the Yang-Mills theory.
 - Symmetry breaking (Goldstone theorem) and Higgs mechanism.
 - Polykov monopole and the BPST monopole via the Bogomol'nyi bound.
 - Report: <https://github.com/ameypg16/Reports/blob/master/Amey-Report-SNBhatt.pdf>.
- Multistability of planar bistable liquid crystals** (National Program on Differential Equations(NPDE))
(Guide: Prof. Neela Nataraj (HOD: Department of Mathematics,IITB) , Winter 2016)
 - Finite Elements Method and the Newton Galerkin approximation to analyse what drives the normal bistable liquid crystals into multistability.

- Analysis done using the Landau de Gennes free energy framework for the liquid crystals.
- Report: <https://github.com/ameypg16/Reports/blob/master/NPDE-report.pdf>
- Code files: <https://github.com/ameypg16/NPDE-Final-D1>.

COURSE PROJECTS

- **2D Mapping using Ultrasonics** (EP 315 Electronics Lab - Microprocessors)
(Prof. Pradip Sarin (Department of Physics, IITB), Autumn 2017-18)
 - Used Arduino microprocessor and ultrasonics to map out the 2D topological features.
 - The 2D map was plotted on the monitor.
 - Report: <https://github.com/ameypg16/Reports/blob/master/Microprocessors-Report.pdf>
- **Music Synthesis** (EP 226 - Waves, Oscillations and Optics)
(Guide: Prof. Tapanendu Kundu (Department of Physics, IITB) , Spring 2016-17)
 - Developed a code to tailor a song from the bare essentials - the frequency of the notes/chords involved and the duration.
 - Appropriate ADSRs were chosen depending on the instrument and the scenario being mimicked.
 - Report: <https://github.com/ameypg16/Reports/blob/master/music-synthesis-report.pdf>
- **3 Body Collider Simulation** (EP 230 Electronics Lab - Digital Systems)
(Guide: Prof. Pradip Sarin (Department of Physics, IITB) , Spring 2016-17)
 - Developed a code in VHDL using an FPGA board to simulate an animation involving 3 bodies.
 - The bodies were coded to bounce off each other and off the walls delimited by the VGA monitor.
 - Project Report : https://github.com/ameypg16/Reports/blob/master/FPGA_project_3_body_collision.pdf
- **Chaos in Cryptography** (PH 542 Non Linear Dynamics)
(Guide: Prof. Amitabha Nandi (Department of Physics, IITB) , Autumn 2016-17)
 - Analyzed the topological similarities between cryptography and chaos theory and how chaos can be used in cryptography.
 - Used the Baptista algorithm and chaotic maps were developed on the basis of the logistic map and Lorenz's dynamical model.
 - Project Presentation: <https://github.com/ameypg16/Reports/blob/master/NLDproject.pdf>

ACADEMIC ACHIEVEMENTS

- Ranked **second in the institute among a batch of 900 students** for the academic years 2015 - 2018.
- **Topper in the Physics Department** for the academic years 2015-18.
- Ranked **first** in the Physics Department in the academic year 2015-2016.
- **Awarded the Institute Academic Award** by IIT Bombay for the year 2015-16 (**3rd in the Institute** - CPI-9.94)
- Secured an **SPI of 10.0** in the first semester 2015-16.
- Awarded **AP** grade (awarded to the top 1% of the class) for Calculus and Numerical Analysis.
- **2015** : Topper in Maharashtra Board in **Physics** (100/100) and **Electrical Maintenance** (200/200)
- **2014-15** : **National Top 1% in NSEP** (Physics).
- **2014-15** : **National Top 1% in NSEA** (Astronomy).
- **2015** : Offered admission to the **Chennai Mathematical Institute (CMI)**, **Indian Statistical Institute (ISI)**, and the **Indian Institute of Science (IISc)**.

MENTORING EXPERIENCE

- **Department Academic Mentorship Program (DAMP)**: Appointed as a mentor for the Physics Department for the academic year **2018-19**. Mentor to sophomores and third year students to help them to know what the department offers them - different research avenues, professors, extra courses, administration, etc.

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.

RESUME AND REPORTS

- Resume : <https://github.com/ameypg16/CV>
- Reports : <https://github.com/ameypg16/Reports>