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	2020	9.83
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, Theoretical Condensed Matter Physics, String theory, Mathematical physics, Cosmology

TECHNICAL SKILLS

- **Languages** : C++, Java, Python, VHDL
- **Tools** : Mathematica, LaTeX, OriginPro, MATLAB, Gravipy, 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 (Ongoing), Group theory Methods in Physics (Ongoing), Relativistic Quantum mechanics (Ongoing) and Quantum Field Theory (Ongoing)

MAJOR PROJECTS

- **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 (Ongoing))
  - 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.
- **Multistablity 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 frmaework for the liquid crystals.
  - Report: https://github.com/ameypg16/Reports/blob/master/NPDE-report.pdf
  - Code files: https://github.com/ameypg16/NPDE-Final-D1.
- **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 - 2016 and 2016-2017.
- **Topper in the Physics Department** for the academic years 2015-16 and 2016-17.
- 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 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 **CMI, ISI, and IISc**.

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