Sahil Adane

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Education

2016–2020 **Indian Institute of Technology, Bombay**,
Engineering Physics, Bachelor of Technology, GPA – 8.49/10

Experience

Aug 2020 - Ongoing **Systems Engineer**, Sedemac Mechatronics Pvt. Ltd.,
Designs and manufactures control technologies for automotive powertrains for sale to OEMs.,
Supervisor: Sudeep Solanki, Chief Engineer
Part of the team developing control stategies for electronic fuel injection for internal combustion engines

Dec 2020 - June 2021 Proof-of-concept of stock electronic fuel injection strategies on a 2 wheeler engine
- Benchmarking a competitor's engine control unit by testing response under known difficult use-cases.
- Drawing inferences regarding system response after writing scripts for data-cleaning and visualization.
- Improving the current model by incorporating the new insights to demonstrate a working prototype.

July 2021 - Oct 2021 Designing a faster calibration process for a chosen air-estimation model and optimality criterion
- Data collection at diverse operating conditions to fit an air-estimation model useful for simulations.
- Exploratory regression analysis for different models followed by diagnostics for ordinary least squares estimation to find an interpretable model offering same accuracy as the stock strategies.
- Design the future experiments choosing a suitable optimality criterion for the chosen model to consequently reduce the cost of the calibration activity while maintaining the prediction accuracy.

May 2019 - July 2019 **Research Intern**, University of Luxembourg,
Supervisor: Prof. Ludger Wirtz, Dept. of Physics, University of Luxembourg
Understanding the Raman spectra of Cu_2GeS_3 using ZnS, materials with application in photovoltaics
- Developing a multiatomic force model starting from first principles by testing different interatomic potentials.
- Comparing between models by minimising a loss function defined using experimental data and model estimates.
- Simulated the change in intensity peaks in the Raman spectrum of Cu_2GeS_3 to those in the spectrum of ZnS by studying intermediate hypothetical lattice structures.

Academic Projects

July 2018 - Nov 2018 **Differential forms, Group Theory and Physics** , *(Supervised Learning Project)*,
Supervisor: Prof. P Ramadevi, Dept. of Physics, IIT Bombay
- Studied the abstract formalism of differential geometry and its simplifications under specific conditions to known theorems and operators in multivariable calculus.
- Examined the nice interplay of group theory symmetries and the conservation laws in field theory, in this case the connections to Chern-Simons theory.

May 2018 - July 2018 **Study of BTZ Blackhole and Green's Functions, General Relativity**,
Supervisor: Prof. Urjit Yajnik, Dept. of Physics, IIT Bombay
- Studied the structural and geometrical properties of 2+1 Dimensional (BTZ) Blackhole and the analogies with Kerr blackhole following the original paper by M. Banados, C. Teitelboim, J. Zanelli.
- Explored Feynman's Path Integral Approach as an introduction to application of Green's functions in Quantum Field Theory for scalar fields.
- Identified BTZ Blackhole background as a quotient space of covering space of Anti-DeSitter spacetime and used Method of images to relate the Green's function for both spacetimes as done by S. Carlip.

Feb 2018 - Apr 2018 **Weak Gravitational Lensing Surveys**, *(Course Project: Astrophysics)*,
Supervisor: Prof. Subhabrata Majumdar, Tata Institute of Fundamental research,
Instructor: Prof. Vikram Rentala, Dept. of Physics, IIT Bombay
- Explored introductory literature on Weak Gravitational Lensing and its applications in improving constraints on cosmological parameters.
- Examined the usage of Fischer Matrices as a statistical method to get parameter values from the convergence power spectrum.

Positions of Responsibility

Apr 2018 - Mar 2019 **Academic Mentor**, D-AMP team, Department of Physics
Selected among 14 mentors based on interviews, peer reviews, and overall performance
- Mentored 6 sophomore undergraduate students to ensure smooth transition into Physics department.
- Conducted course reviews and AMAs with professors to increase student-professor interaction.

May 2018 - July 2018 **Teaching Assistant**, Course: Quantum Physics and Applications
One of the 4 TAs for the summer course under Prof. M. Aslam, Dept. of Physics, IIT Bombay
- Conducted tutorial sessions for a batch of 20 and involved in setting up and evaluation of exams.

Scholastic Achievements

May 2016 Secured an All India Rank of **755** out of **0.2 million** candidates in JEE Advanced.

May 2012 Awarded the National Talent Search Examination (NTSE) Scholarship awarded to the top 99.8 percentile.

Relevant Courses/General Audience books

Online MIT OCW 14.73 Challenge of World Poverty,
MIT OCW J-PAL Executive Training programme: Evaluating Social programs,
MIT OCW 14.32 Econometrics

Classroom Introduction to Economics, Industrial Economics, Environmental Economics, Data Analysis and Interpretation (Introduction to Statistics and Probability), Linear Algebra, Calculus, Differential Equations, Numerical Analysis, Introduction to Programming with C++

Skills

Languages Python, C++, MATLAB

Utilities Version control with Git

Extra Curriculars

Dec 2018 Attended GROWTH Winter School introducing participants to astronomical techniques.

Aug 2016 Conceptualized and edited the video that won 3rd place in Music Video Competition, Freshiezza.

2016-2017 Completed one year of training in Volleyball by the National Sports Organization.

2014 Part of the School Cricket Team that won Under-14 Giles Shield Plate Division, Mumbai.