# Sahil Adane

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## Education

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

2014–2016 **Maharashtra State Board of Secondary and Higher Secondary Education**,
*Intermediate/+2*, Pace Junior Science College, Mumbai, Score – 90.62 %

2004–2014 **Maharashtra State Board of Secondary and Higher Secondary Education**,
*Matriculation*, Swami Vivekanand International School, Mumbai, Score – 96 %

## 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

July 2021 - Oct 2021 Optimal calibration process for a chosen air-estimation model and optimality criterion
- Collected data at diverse operating conditions to fit an air-estimation model useful for simulations
- Performed 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
- Designed future experiments by choosing a suitable optimality criterion for the chosen model to reduce the cost of the calibration activity while maintaining the prediction accuracy

Dec 2020 - June 2021 Proof-of-concept of stock electronic fuel injection strategies on a single cylinder engine
- Understood the physics under difficult use-cases and benchmarking a competitor's control unit
- Drew inferences about system response after writing scripts for data-cleaning and visualization
- Improved the current model by incorporating the new insights to demonstrate a working prototype

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
- Developed a force model using first principles by testing different interatomic potentials
- Compared models by defining a loss function 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

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

OCW MIT 14.73 Challenge of World Poverty,
MIT 14.32 Econometrics

## 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