

Vidya Sagar Vobbiliseti

Indian Institute of Technology Madras (IITM)

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Education

Program	Institution	%/CGPA	Year of completion
○ Bachelor of Technology, Engineering Physics	○ Indian Institute of Technology Madras	○ 7.67/10 #	○ 2019
○ XII Std. (TS state board)	○ Narayana Junior College, Hyderabad	○ 94.6%	○ 2015
○ X Std. (TS state board)	○ Vidya Dayini High School, Hyderabad	○ 8.6/10	○ 2013

6th semester

Research Experience

1. Improvements in muon identification based on Monte Carlo simulations of the Belle Detector **May - July 2017**
Guide: Dr. Gagan Mohanty, Department of HEP, Tata Institute of Fundamental Research Summer internship

- Explored the possibility of optimising muon identification based on information from inner sub-detectors of the **Belle experiment**.
- Started with the fundamentals of statistical learning and further developed an artificial neural network using Monte Carlo simulated events from the experiment.
- Observed **muon identification efficiencies of 96.8% and 99.4%** when discriminating against pions and kaons, respectively, for a given **fake rate of 0.7%**.

2. Improvements in muon identification of the Belle Detector (cont.) **August 2017 - Current**
Guide: Dr. Jim Libby, Department of Physics, IIT Madras Bachelor's Thesis Project

- Included calorimeter information to the above analysis.
- Improving the muon identification primarily for **low-momentum muons**, those which may not reach K-Long and Muon (KLM) Detector.
- Working on analysing the CP violating rare decay $D^0 \rightarrow \pi^0 \mu^+ \mu^-$ using the improved muon identification.
- Similar muon identification will be implemented in **Belle2 framework**, once successful.

3. Partitions - Number theory **August 2016 - March 2017**
Guide: Dr. Suresh Govindarajan, Department of Physics, IIT Madras

- Computationally found the number of 7-dimensional partitions whose 8-dimensional Ferrers Diagrams fit into a volume of hypercube of side 2 and **reproduced the results in A269699** using the Bratley-McKay algorithm.
- Worked on refining the Wiedemann computation of $M[8]$ by computing $T(8,k)$ for $k=0,1,2,56$.

4. Exoplanet Identification **August 2017 - November 2017**
Club: Astronomy and Physics, Center for Innovation, IIT Madras

- Applied **Convolutional Neural Network** on the **NASA's Kepler data** to identify exoplanets based on the principle of **Transit Photometry**.
- A reliable classifier is obtained despite having heavy data imbalance of 200:1.

5. Reading Project **May - July 2016**
Guide: Dr. Jim Libby, Department of Physics, IIT Madras

- Studied Relativistic Mechanics, Symmetries, Feynman Calculus, basics of Quantum Electrodynamics.
- Learned to evaluate **scattering amplitudes** for two particle collisions and one particle to n-particle decays.

6. Class-D Audio Amplifier **January - March 2017**
Course: Analog Circuits Laboratory Course Project

- Built and demonstrated a composite analog system for **synchronized light and sound** using amplifiers, oscillators, non-overlap generators, pulse width modulators etc.

Scholastic Achievements

- Recipient of **Best Project Award** in High Energy Physics Department for my work at the Tata Institute of Fundamental Research.
- Selected for **Visiting Student Research Programme (VSRP)** at the **Tata Institute of Fundamental Research (TIFR)**.
- Presented my work on muon identification at **Belle Analysis Workshop - 2017**, which took place in MNIT, Jaipur, India.

Skills

- **Languages and Markup:** C, C++, Python, LISP, HTML, XML
- **Softwares and Packages:** ROOT, TMVA, NumPy, matplotlib, Mathematica, MATLAB, scikit-learn, TensorFlow, LTSpice, Verilog, CAD
- **Operating Systems:** Linux (Debian based, Arch, Fedora), Windows
- **Documentation:** \LaTeX

Relevant Coursework

Physics

- Advanced Particle Physics
- Classical Field Theory
- Quantum Mechanics II
- Statistical Mechanics
- Engineering Optics
- Electromagnetism and Applications
- Physics Lab - I, II, III, IV
- High Energy Physics
- Quantum Computation and Quantum Information
- Principles of Quantum Mechanics
- Thermodynamics
- Classical Dynamics
- Atomic and Molecular Spectroscopy

Mathematics

- Linear Algebra
- Group Theory
- Probability and Statistics
- Introduction to Mathematical Physics

Electrical Engineering

- Solid-state Devices
- Electrical Circuits and Networks
- Analog Systems and Lab
- Signals and Systems
- Digital Systems and Lab
- Digital Signal Processing

Extra-Curricular Activities

Technical Affairs Secretary

- Elected and served as the Technical Affairs Secretary of Saraswathi Hostel to lead the teams in all inter-hostel technical competitions including manual robotics, semi-autonomous robotics and quad-copter design.

Science Communication

- Exploring science communication through blogging at www.vidyasagarv.com and making videos at YouTube channels [FartScience](#) and [FartScience 2](#).

Leadership and Organization

- Member of the organizing committee of Bhoutics, the annual physics fest of the Physics Department, IIT Madras in its founding year and the next (2016, 2017).

Community Engagement

- Taught essential sciences to 3 government schools covering 240 students in the form of video lectures as a part of National Service Scheme.

Sports

- Finished three 5km runs: Terry Fox, Samanvay and Shaastra.
- Finished one 21km cyclothon.