

SHREYAS PADHY

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EDUCATION

Indian Institute of Technology, Delhi

May 2017 (expected)

B.Tech in Engineering Physics

Overall GPA: 8.70/10

RELEVANT COURSEWORK

Classical Mechanics & Special Relativity¹, Quantum Mechanics, Electrodynamics, Mathematical Physics, Optics, Semiconductor Devices¹, Materials Synthesis, Signals and Systems¹, Digital Electronics, Artificial Intelligence, Data Structures & Algorithms, Numerical Methods in Electromagnetics²

RESEARCH INTERESTS

Radio & Observational Astronomy, Cosmology & Astrophysics, Computational Electromagnetics

RESEARCH PROJECTS

Adaptive Meshing Techniques in Microwave Imaging

May 2015 - Present

Under supervision of Dr. Uday Khankhoje, Dept. of Electrical Engineering, IIT Delhi

- Working on adaptive meshing techniques to improve resolution and computational time for bio-medical microwave imaging of cancerous tumors.
- Implemented an inverse solver for microwave imaging using the Constraint Projection Method with block constraints and line backtracking search.
- Designed an adaptive mesh reconfiguration algorithm that uses a multilevel sampling algorithm based on filtered backpropagation predictions of the solution to the inverse problem.

Stochastic Methods in Rough Surface Scattering

December 2014 - Present

Under supervision of Dr. Uday Khankhoje, Dept. of Electrical Engineering, IIT Delhi

- Working on stochastic modelling of rough surfaces to improve speed of forward solver in radar backscattering from inhomogenous rough soil.
- Implemented a stochastic modelling of the rough surface using a Kosambi-Karhunen-Loeve expansion in the Galerkin polynomial chaos basis involved in the Finite Element Method solution.

Study of the Crab Nebula using Ground Based Gamma Ray Telescoping **December 2013**

Under supervision of Dr. Kuldeep Yadav, Bhabha Atomic Research Centre

- Analysed the periodicity and spectrum of the gamma ray emission of the Crab Nebula using very high energy ground-based gamma ray telescoping methods.
- Analysed data obtained from observations made by the TACTIC telescope located at Mt. Abu, Rajasthan.

RESEARCH EXPOSURE

Pulsar Observatory for Students

July 2013

Conducted by National Centre for Radio Astrophysics

- Performed time-series observations for prominent pulsars B1642-03, B1133-16, and Vela pulsar using the Ooty Radio Telescope.

¹Current

²Non-graded

- Calculated the dispersion measure, flux density, period, modulation index and pulse broadening of B1642-03 and Vela pulsar.

National Initiative for Undergraduate Studies Physics Camp May 2014 - June 2014
Conducted by Homi Bhabha Centre for Science Education

- Part of 40 students selected from across India to receive research exposure on a variety of topics from prominent researchers in the field.
- Attended lectures on Stellar Astrophysics, Neutron Star Condensed Matter Physics, Newtonian Cosmology, Radio Interferometry, Quantum Computation, Solitons and Non-Linear Fibre Optics, and Particle Physics.

Winter Internship at National Centre for Radio Astrophysics December 2014
Under Dr. Tirthankar Roy Choudhary, NCRA

- Worked on mass functions defining large scale structure in cosmological models defining the early Universe, and the application of random walks in calculating and approximating these mass functions.

International Olympiad in Astronomy and Astrophysics National Training Camp March 2013 - May 2013
Conducted by Homi Bhabha Centre for Science Education

- Part of 30 students selected from across India to receive training for the International Olympiad in Astronomy and Astrophysics, in observational astronomy and theoretical astrophysics.

TECHNICAL PROJECTS

Amateur Radio Interferometer Experimental System July 2015 - Present
Under the ARIES program, IIT Delhi

- Made an amateur radio telescope from a satellite dish capable of recording the 21cm line from measurements of the Sun.
- Currently working on building a two-dish interferometer with a tracking mount to capture 21cm galactic line.

Multiple Sequence Alignment of DNA February 2015 - May 2015
Course Project, Under supervision of Dr. Mausam, Dept. of Computer Science, IIT Delhi

- Implemented depth-first-search with branch & bound for optimal solution to alignment of multiple DNA sequences.
- Implemented greedy hill-climbing local search with simulated annealing, and pseudo-random restarts, for non-optimal solution.

TECHNICAL STRENGTHS

Computer Languages	C++, Java, Python, L ^A T _E X, Verilog
Computational EM	Meep (FDTD), Cubit (Meshing), Seldon
Mathematical Computing	MATLAB, Mathematica, R
App Design	iOS (Objective C)

SCHOLASTIC ACHIEVEMENTS

- Received Merit Scholarship for Top 7% GPA in institute in Fall Semesters, 2013 and 2014.
- Recipient of the KVPY Scholarship in the year 2011-2012
- Recipient of the NTSE Scholarship in the year 2009-2010

POSITIONS OF RESPONSIBILITY

- Executive, Astronomy Club IIT Delhi.