Aravind Bharathi

Engineering Physics with Honours

Chennai, India
bv.iitb.2023@gmail.com
aravindbharathi.github.io
aravindbharathi

Education

Present **B. Tech.,** *Department of Physics, Indian Institute of Technology Bombay, Mumbai, India*

Research Interests

- General Relativity
- Cosmology
- Mathematical Modelling
- Image Processing
- Astrophysics
- Computational Physics
- Numerical Analysis
- Geometric Algorithms

Publications and Awards

2021 Recipient of the IIT Bombay Undergraduate Research Award 01

2020 Katla V., Valluvan A. B. et al. "An Approach to Star Tracker Design for Nano-Satellite Applications" extended abstract presented in National Conference on Small Satellite Technology and Applications, Trivandrum, India, 2020

Research Experience

Present **Astrometric Microlensing with GAIA**

Principle Inv. *Professor Vikram Rentala, Department of Physics, IIT Bombay*

- If dark matter is made up of primordial black holes then these black holes should be scattered all over our galaxy. As stars pass behind these PBHs, their light would get bent around them due to an effect known as gravitational lensing
- I am currently working towards implementing an end-to-end pipeline to estimate the blips in time-series light data from modern space telescopes to detect dark matter subhalos and predict if they are equivalent to PBHs

2020 – 2021 **Canopy Height Estimation using drone-based RGB Images**

Principle Inv. *Professor J. Adinarayana, Institute Chair Professor, IIT Bombay*

- A multi-disciplinary consortium of research institutes where data-science based approaches are taken to support high performance and sustainable agricultural systems in semi-arid tropics of India
- Towards the same goal, I developed a framework to estimate the height of agricultural crops from optical images through techniques used in digital photogrammetry

Notable Projects

Present **IIT Bombay Student Satellite Program** | Electrical Subsystem

- The Student Satellite Program is a landmark project taken up by IIT Bombay students with an objective to make the institute a respected centre of excellence in satellite and space technology
- Having successfully built and flown its first satellite, *Pratham*, the team is currently working on five space-based missions of which I am a part of the Star Tracker-based Attitude Determination System

Present **Astronomy Animation Team** | Technical Animator, Co-Founder
Advisor *Dr. Akshat Singhal, Department of Physics, IIT Bombay*

Summer 2021 **Computational Geometry and Algorithms**
Guide *Professor A. Agrawal, Department of Computer Science and Engineering, IIT Madras*

Spring 2021 **Quantum Imaging using Complex Degree of Coherence**
Guide *Professor Anshuman Kumar, Department of Physics, IIT Bombay*

A comprehensive list of all projects can be found here

Institute Positions

Present **Subsystem Head** | Electrical
Student Satellite Program, IIT Bombay

Present **Division Lead** | Astrophysics
Astronomy Animation Team, IIT Bombay

Present **Department Academic Mentor**
Student Mentorship Program, IIT Bombay

Summer 2021 **Panel Member** | Institute Technical Summer Project
Institute Technical Council, IIT Bombay

2020 – 2021 **Institute Technical Convener**
Maths and Physics Club, IIT Bombay

Technical Skills

Programming C++, Python, Matlab, C, VHDL, ROOT
CAD & Sim. Blender, EAGLE, SPICE, Quartus Prime
Dev. Tools Git, Docker, OpenCV, Pillow, GDAL

Courses Taken

List of courses taken can be found here

Miscellaneous

- Active public speaker and science communicator
- Long-distance cyclist and recreational triathlete
- Highest typing speed: 112 *words-per-minute*. Average: 98 *words-per-minute*
- Certified with the highest possible Grade 8 in music performance for piano

Complete CV available on request