# Anumanchi Agastya Sai Ram Likhit

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## About Me

I am an aspiring astronomist with a keen interest in astronomy and astrophysics, particularly focusing on exoplanets, stars, galaxies, radio astronomy, observational astronomy, and astronomical instrumentation. With a solid foundation in data science, I actively seek to integrate these skills in the realm of astronomical research and instrumentation. Through hands-on experience and continuous learning, I aim to contribute innovative solutions to the field and play a part in the exciting advancements shaping our understanding of the cosmos.

## Education

**Indian Institute of Science Education and Research Bhopal** — **Dec. 2020 – Present**
*BS Physics - 7.53/10.00* — *Bhopal,India*

**Board of Intermediate Education Andhra Pradesh** — **Jul. 2018 – Mar 2020**
*Senior Secondary - 9.79/10.00* — *Vijayawada,India*

**Board of Secondary Education Andhra Pradesh** — **Mar. 2018**
*Secondary - 9.80/10.00* — *Vijayawada,India*

## Publications

**A Novel Sector-Based Algorithm for an Optimized Star-Galaxy Classification** — ***Accepted***
*Anuamanchi Agastya Sai Ram Likhit, Divyansh Tripath, Akshay Agarwal* — *Confrence Paper*
ICLR Tiny Paper 2024

**An Innovative Web Tool for Remote Data Acquisition and Analysis : Customized for SKA Test LPDA Setups at Gauribidanur Radio Observatory.** — ***In Prep***
*Anuamanchi Agastya Sai Ram Likhit, Katta Navenn, Arul Pandian.B, Abhishek.R & Prabu.T* — *Resarch Paper*
Aiming to Publish in Journal of Astronomy and Astrophysics

**Two-Element Radio Interferometer: Exploring the SKA Low Frequency Band at Gauribidanur** — ***In prep***
*Anuamanchi Agastya Sai Ram Likhit, Katta Navenn, Arul Pandian.B, Abhishek.R, N. Arutkeerthi, Krishna Balaji, Roshan Kumar Dora, Deep Bhowmik & Prabu.T* — *Research Paper*
Aiming to Publish in Journal of Astronomy and Astrophysics

## Research Experience

**Validation of Transiting Exoplanets using Statistical Tools (VaTEST)** — **Jan 2024 – Present**
*Member of VaTEST* — *Remote*

- Utilized statistical tools (Juliet, Triceratops) to validate exoplanet candidates from TESS light curves and radial velocity data.
- Analyzed photometric and spectroscopic data to determine exoplanet characteristics.
- Applied probabilistic algorithms for distinguishing true exoplanets from false positives.
- Collaborated in an ongoing effort for the bulk validation of unconfirmed exoplanets, at VaTEST.

**Radio Astronomy Observations, Instrumentation and Data Analysis** — **May 2023 – August 2023**
*Visiting Student, Raman Research Institute* — *Bangalore, India*

- Designed and simulated an Array of Log Periodic Dipole Antennas in Computer Simulation Technology Software.
- Played a key role in the establishing setup of an antenna array at Gauribidanur Radio Observatory as part of the Square Kilometre Array (SKA) tests.
- Conducted solar and galactic plane transit observations and developed a custom data analysis pipeline, key in producing accurate transit plots and fringe patterns that validated the new array's observational capabilities.
- Engineered a comprehensive user friendly web interface for the LPDA setup, streamlining remote observations, data downloading, and processing.
- Also conducted observations of the Hydrogen line (H line), corresponding to the 21cm wavelength (1420 MHz frequency), using a 4.5m dish antenna with a horn feed, RTL-SDR, and GNU Radio software.

**Optimizing Stars and Galaxies Classification using Neural Networks** **Aug 2023 – Dec 2023**
*IISER Bhopal - Instructor : Dr.Akshay Agrawal* *Bhoapl,India*

- Developed a novel methodology for star galaxy classification by sectorizing the sky.
- Proposed a convolutional neural network model that outperforms the existing models in terms of accuracy and computational cost.
- Validated the proposed methodology and model using data from the latest Sloan Digital Sky Survey Data Release 18 (SDSS DR-18).

**Identifying Potential Habitats Beyond Earth** **Aug 2023 - Jan 2024**
*Personal Project* *Bhoapl,India*

- Developing a multilayered statistical model 'Exocluster' to conduct analysis on NASA's Confirmed Exoplanets.
- Identified promising exoplanet clusters for future targeted spectroscopic observations from over 5,535 confirmed exoplanets, demonstrating the impact of advanced data analysis in exoplanetary science.

**Research Intern, Pulsar Observations and Radio Astronomy Imaging** **Jan 2023 – Mar 2023**
*IISER Bhopal* *Bhoapl,India*

- Engaged in an intensive study of pulsar observation techniques, detections, and timing analysis under the guidance of Dr.Mayuresh Surnis
- Acquired practical skills in radio astronomy imaging, specifically working with Very Large Array (VLA) data.
- Conducted image analysis using the Common Astronomy Software Applications (CASA) package, following the VLA tutorial protocols to process and analyse astronomical data.

**Optimization of an 1-D Hyper Telescope for a Direct Imaging in Astronomy.** **Jan 2023 – Mar 2023**
*IISER Bhopal - Instructor : Dr. P.B. Sujit* *Bhoapl,India*

- Optimized a one-dimensional hyper telescope using nonlinear optimization techniques for enhanced direct imaging for Exoplanets orbiting Young Stars.
- Integrated principles of interferometric optical astronomy with data science methodologies to refine observational data processing.

For more details on my Experiences listed above and other Experiences, please visit this page on my website.

## Work Experience

**Chegg Subject Matter Expert, Advanced Physics | *Chegg, Inc.*** **Oct 2022 – Present**

- Provide expert solutions and explanations for physics questions to assist students in their learning process.
- Participate in regular training to stay updated with the latest developments in physics.
- Collaborate with other experts and engage in knowledge exchange to enhance subject matter expertise.

## Presentations

**An Innovative Web Tool for Remote Data Acquisition and Analysis : Customized for SKA Test LPDA Setups at Gauribidanur Radio Observatory.** ***Nov 2023***
*4th Annual Meet of Modern Engineering Trends in Astronomy (META-2023)* *Poster*
- Received Best Poster Presentation Award.

**Identifying Potential Habitats Beyond Earth: A Multilayered Statistical Analysis of NASA's Confirmed Exoplanets.** ***Feb 2024***
*The 42nd meeting of the Astronomical Society of India (ASI - 2024)* *Poster*
- Selected for Presentation in the category of Sun, Solar System, Exoplanets, and Astrobiology

## Workshops and Conferences

**Astronomical Society of India (ASI) - 2024 Conference** **Feb 2024**
*IISC & ISRO* *Bangalore*

**Modern Engineering Trends in Astronomy (META) - 2023 Conference** **Nov 2023**
*Raman Research Institute* *Bangalore*

**2023 Sagan Exoplanet Summer Hybrid Workshop** **Jul 2023**
*NASA Exoplanet Science Institute* *Remote*

**IIA Online Summer Programme - 2022** **Jul 2022**
*Indian Institution of Astrophysics* *Remote*

For detailed information on my workshop and conference engagements, please visit this page on my website.

## Honours and Awards

**Best Poster Award** **Nov 2023**
*4th Annual Meet of Modern Engineering Trends in Astronomy (META-2023)* *Raman Research Institute*

- An Innovative Web Tool for Remote Data Acquisition and Analysis: Customized for SKA Test LPDA Setups at Gauribidanur Radio Observatory.

## Relevant Coursework

- Classical Mechanics
- Statistical Mechanics
- Quantum Mechanics
- Electrodynamics and Special Theory of Relativity
- General Theory of Relativity
- Introduction to Astronomy and Astrophysics
- Cosmology
- Numerical Methods and Programming
- Data Science in Practice
- Machine Learning
- Computer Vision
- Data-driven Astronomy

## TECHNICAL SKILLS

**Languages**: Python, Mathematica, MATLAB, C, SQL
**Software & Tools**: CASA, SAOImage DS9, GNU Radio, GitHub, RTLSDR
**Technologies**: Linux, CST Microwave Studio

## Extracurricular Activities

(1) Member of Validation of Transiting Exoplanets using Statistical Tools (VaTEST), (2) Team Member of IISER Bhopal Astronomy Research Group, (3) Volunteer of Inter IISER Sports Meet 2022, (4) Volunteer of Enthuzia'22-IISER Bhopal, (5) Campus Ambassador of Techkriti'22-IIT Kanpur