

# SAHIL JHAWAR

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## EDUCATION

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### Universität Potsdam

Master of Science in Astrophysics

Grade\*: 1.7 (gut/good)

Thesis 

October 2021 - June 2025

Potsdam, Germany

#### Coursework:

- Gravitational Wave Astrophysics
- General Relativity
- Multi-messenger astronomy
- Computational Astrophysics
- Bayesian Statistics<sup>†</sup>
- Statistics<sup>†</sup>

### Christ (Deemed to be University)

Bachelor of Science (Physics, Maths and Electronics)

GPA: 3.68/4.0

July 2018 - June 2021

Bengaluru, India

**Final Year Project:** Gesture Controlled System based on Raspberry Pi Pico  Report

## WORK EXPERIENCE

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### GFZ Helmholtz Centre for Geosciences

Research Assistant - July 2025 - Present

Student Assistant - July 2024 - June 2025

July 2024 - Present

Potsdam, Germany

Software Developer in the Section 1.5 - Space Physics and Space Weather

- Developed a real-time ETL pipeline and testing framework for processing NASA/JAXA spacecraft data, implementing over 4,000 lines of code.
- Deployed and maintaining quasi-real-time space-physics based machine learning model and testing of the translated Python-based workflows.
- Migrated ~2,500 lines of legacy code to Python, including data assimilation algorithms from MATLAB and geomagnetic models from FORTRAN.
- Collaborated with team members to ensure seamless implementation
- Developed software deliverables for the European Space Agency as part of funded research projects.
- Developed a Python-based space weather monitoring system using in-house forecasted Kp data for real-time analysis, threshold-based alerting, and automated email reporting.

### Leibniz-Institut für Astrophysik Potsdam (AIP)

Student Assistant

December 2022 - March 2024

Potsdam, Germany

Student Assistant in the Project Management team for building (integration, installation and maintenance) the 4-metre Multi-Object Spectroscopic Telescope *4MOST*.

- Implemented *4MOST* commissioning procedures during 3 week coding campaign (November 2023)
- Utilized technical skills in troubleshooting and problem-solving within the specialized environment of an astronomical integration hall.

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\*See here on how to interpret German grade: Welche Form der Benotung wird an der Uni Potsdam verwendet?

<sup>†</sup>University coursework without credits

- Proactively managed procurement activities, liaising with vendors to procure essential large-scale items for the integration hall.

## RESEARCH EXPERIENCE

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### Theoretical Astrophysics Group, Universität Potsdam

March 2023 - June 2025

*Master's Thesis*

Potsdam, Germany

Master's thesis student under **Prof. Dr. Tim Dietrich**.

- Maintaining and contributing to software infrastructure with over 60 forks, 40+ stars, and 15,000+ Conda downloads.
- Developed Bayesian models for analyzing astronomical datasets using NMMA, focusing on optimizing parameter estimation.
- Quantified and minimized non-stationary uncertainties by 2-10x in astrophysical parameter estimation and predictions.
- Designed a SHA-256 hash-based system to verify and automate file replacement for data consistency required for astrophysical simulations.
- Presented my findings as the first author on one research paper and as a co-author on another.

### Universität Potsdam & Astronomical Institute of CAS

August 2022 - September 2022

*Participant*

Prague, Czech Republic

- Utilized the Perek 2m telescope at the Ondřejov Observatory to acquire stellar spectra
- Performed data reduction and analysis using IRAF Python for data visualization

### IUCAA & NCRA-TIFR

December 2020 - January 2021

*Winter Student*

Pune, India

**Radio Astronomy Winter School 2020:** Learned basics of radio astronomy, from theory to instrumentation and computational aspects. Workshop enabled me to work on few physical experiments and on GMRT and ORT data of Vela pulsar.

🔗 *Detailed reports can be found here*

### Krittika, IIT Bombay

May 2020 - August 2020

*Summer Project Intern*

Mumbai, India

Developed a Python package to analyse various types of binary star system.

## PUBLICATIONS

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1. **Sahil Jhavar**, Thibaud Wouters, Peter T. H. Pang, et al. "Data-driven approach for modeling the temporal and spectral evolution of kilonova systematic uncertainties". In: *Phys. Rev. D* 111 (4 2025), p. 043046. DOI: 10.1103/PhysRevD.111.043046.
2. M M Desai, D Chatterjee, **S Jhavar**, et al. "Rapid parameter estimation for kilonovae using likelihood-free inference". In: *Monthly Notices of the Royal Astronomical Society* 541.3 (June 2025), pp. 2619–2630. DOI: 10.1093/mnras/staf1045.
3. T. Hussenot-Desenonges, T. Wouters, N. Guessoum, et al. *Multi-band analyses of the bright GRB 230812B and the associated SN2023pel*. 2023. arXiv: 2310.14310 [astro-ph.HE].

## OBSERVING EXPERIENCE

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### Perek 2m Telescope

Assisted with 7 nights (Ondřejov, Czech Republic)

### OST 0.5m Telescope

Assisted with 2 nights (Potsdam, Germany)

## TECHNICAL PROJECTS

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### SWVO

*contributor and maintainer*

Tools for downloading and reading space-weather data and geomagnetic indices.

### Kp Alert

Python-based system for monitoring forecasted Kp index and sending automated alerts.

### NMMA

*contributor and maintainer*

A Pythonic library for probing nuclear physics and cosmology with multimessenger analysis.

### nbbody

Direct N-body code with C++ and JAX backends.

### Gstrain

Interactive Gravitational Wave strain viewer using Streamlit & Plotly. Check it out here 

### BibQuest

Automagically fill your bib file just using bib keys

### uptime

A Github Action and Pages based uptime monitor in Python.

## SKILLS

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<b>Technical Languages</b>	Python, C/C++, L <sup>A</sup> T <sub>E</sub> X, MATLAB, SQL
<b>Technical Skills</b>	Git (-Lab and -Hub), Unix based OS and Windows, Bayesian Inference, Data analysis and visualisation
<b>Packages and tools</b>	NumPy, SciPy, Pandas, Matplotlib, Astropy, Bilby, Seaborn, Sphinx, TensorFlow, scikit-learn, JAX, PyTorch, Streamlit, Selenium, bs4, PyBind, CI\CD, Parallel computing

## OUTREACH AND COMMUNITY ENGAGEMENT

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### Let's Talk Astronomy, Christ

*Student coordinator*

*November 2019 - January 2021*

*Bengaluru, India*

Acted as a liaison between students and faculty. Conducted 15+ talks.

### LIGO-India, Vigyan Samagam (DAE-DST-NCSM, G.O.I) *September and December 2019*

*Scientific Communicator*

*Bengaluru and Kolkata, India*

Successfully played the role of science communicator by explaining GW Science and GW Exhibits to an audience of all ages. Catered to nearly 500 visitors.

## PRIZES, AWARDS AND HONORS

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- 2024** Fully funded visiting fellowship by European Union's Horizon 2020 Programme under the AHEAD 2020 hosted by Dr. Mattia Bulla at University of Ferrara, Italy
- 2024** Fellowship of €500 by ESA for dotAstronomy 2024, ESAC Madrid, Spain
- 2023** Scholarship of ₹35,000 by Badrilal Soni Maheshwari Shiksha Sahyog Kendra, India
- 2021** Awarded co-curricular activities based scholarship from Christ (Deemed to be University)
- 2021** Won numerous inter and intra collegiate events, and successfully lead a team of players resulting in various rolling trophies for the department
- 2020** Gold honor in International Astronomy and Astrophysics Competition (IAAC), secured 38/40 and placed in the top 1% worldwide