

# 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

## RESEARCH EXPERIENCE

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### Theoretical Astrophysics Group, Universität Potsdam

Master's Thesis

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

March 2023 - June 2025

Potsdam, Germany

- Working on Bayesian techniques for Multi Messenger Astronomy using *NMMA* .
- Characterizing the non stationary systematic uncertainties that arise in the modeling of electromagnetic counterparts of multi-messenger source (merged PR )
- Using parallel computing techniques such as MPI and multi-processing to make inferences and analysis faster.
- Resulted in one first author paper published in Physical Review D and one co-authored paper in MNRAS

### Universität Potsdam & Astronomical Institute of CAS

Participant

August 2022 - September 2022

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

Winter Student

December 2020 - January 2021

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

Summer Project Intern

May 2020 - August 2020

Mumbai, India

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

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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

## WORK EXPERIENCE

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### GFZ Helmholtz Centre for Geosciences

July 2024 - Present

Student Assistant - July 2024 - June 2025

Potsdam, Germany

Research Assistant - July 2025 - Present

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

- Implemented an ETL pipeline to process real-time data from NASA, JAXA spacecraft websites, including writing new code and developing the testing framework from scratch.
- Deployed and maintaining quasi-real-time space-physics based machine learning model
- Collaborated with team members to ensure seamless implementation and testing of the translated Python-based workflows.
- Migrated  $\sim 3,000$  lines of legacy code to Python, including data assimilation algorithms from MATLAB and geomagnetic models from FORTRAN.
- Developed software deliverables for the European Space Agency as part of funded research projects.

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

December 2022 - March 2024

Student Assistant

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

## PUBLICATIONS

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1. **Sahil Jhavar**, Thibaut 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. Malina Desai, Deep Chatterjee, **Sahil Jhavar**, et al. “Kilonova Light Curve Parameter Estimation Using Likelihood-Free Inference”. In: (Aug. 2024). Accepted in MNRAS. arXiv: 2408.06947 [astro-ph.IM].
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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### NMMA

contributor and maintainer

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

### nbody

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

## GPIter

Gaussian Processes from scratch with interactive visualization.

## 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,<br>Bayesian Inference, Data analysis and visualisation                                  |
| <b>Packages and tools</b>  | NumPy, SciPy, Pandas, Matplotlib, Astropy, Bilby, Seaborn, Sphinx,<br>TensorFlow, scikit-learn, JAX, PyTorch, CI\CD, Parallel computing |

## OUTREACH AND COMMUNITY ENGAGEMENT

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### Let's Talk Astronomy, Christ

*November 2019 - January 2021*

*Student coordinator*

*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.

### Astronomical Society of India

*February 2019*

*Volunteer*

*Bengaluru, India*

Worked with hospitality committee to cater to all needs of guests and help in the smooth running of the conference during the 37<sup>th</sup> Annual Meeting of ASI at Christ (Deemed to be University).

## 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