Nico **Winkel**

Profile

I am a data scientist and astrophysicist with over 4 years of experience in developing algorithms, modeling, and visualizing large-scale imaging and spectroscopic data. I specialize in advanced analytical methods and statistical modeling, with a strong programming foundation in Python and expertise in cloud-based data analysis and deployment. My experience includes designing and implementing end-to-end data reduction and analysis pipelines, and collaborating on cross-functional projects. I bring a strong record of programming and interest in cutting-edge technology. My goal now is to drive innovation by delivering impactful software solutions through machine learning and imaging technologies, with which I am excited to contribute to the ZEISS Corporate Research & Technology team.

Contact details

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Skills

Programming	Python (NumPy, Pandas, Scikit-learn, SciPy, Astropy), Bash, IRAF, PyRAF
Tools & Frameworks	SQL, Git, Jupyter, LaTeX, Adobe, High-Performance Computing, Time Series Analysis
Cloud & ML	Cloud-based data analysis, model deployment, and operation, applying machine learning techniques to real-world problems.
Data Visualization	Matplotlib, Seaborn, Plotly, DS9, QFitsView, TOPCAT.
Project Management	Agile project management, cross-functional team collaboration, and stakeholder engagement.
Languages	German (native), English (C2), French (A1)

Experience

Postdoctoral Researcher | Data Science 11/2024 — now
Max Planck Institute for Astronomy *Heidelberg, Germany*

- Principal Investigator of a Large Programme (>200h) at ESO's *VLT-UT4* (the most oversubscribed telescope in history), ensuring project execution and data acquisition.
- Conducted data analysis and forward modeling of observations from NASA/ESO telescope *ALMA*.
- Published 1 project as lead scientist and 2 as co-investigator while developing research collaborations.

Doctoral Researcher | Data Analysis 01/2020 — 10/2024
Max Planck Institute for Astronomy *Heidelberg, Germany*

- Analyzed data from NASA's *[Hubble]* and *JWST* space telescopes; developed calibration pipelines for scientific instruments.
- Acquired, analyzed, and modeled terabyte-scale imaging-spectroscopic datasets from various telescopes and instruments.
- Published 4 lead-author projects and contributed to 8 co-investigator studies in international collaborations.
- Secured telescope time with *XMM-Newton*, *ALMA*, *Keck* and ESO's *VLT* and funding through competitive grant proposals.
- Main developer of $\mathrm{Siena}^{\mathrm{3D}}$ – an advanced tool for processing imaging-spectroscopic datasets.
- Presented research at 6 international conferences and 8 research institutions across multiple continents.

Student Assistant | Physics 10/2017 — 09/2019
University of Heidelberg *Heidelberg, Germany*

- Supported STEM students in using scientific techniques and developing independent learning methods.
- Provided tutoring for physics and mathematics to support academic performance.

Degrees

Dr. rer. nat. Astronomy *magna cum laude*
University of Heidelberg, Germany 01/2020 — 10/2024

Master of Science in Physics
University of Heidelberg, Germany 10/2018 — 09/2020

Bachelor of Science in Physics
University of Heidelberg, Germany 10/2014 — 09/2018

Community Service

Referee for science journal Astronomy & Astrophysics 02/2023 — now
Teaching Advanced Physics at University of Heidelberg 04/2021 — 08/2021
Private Tutor for Studentenring in Heidelberg 02/2018 — 11/2019