WILLIAM COOPER

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SUMMARY

Will is a astrophysics and data science lecturer at the University of Hertfordshire, UK. His PhD was completed in 2023 and was half funded by the Insituto Nazionale di Astrofisica, IT – who also hosted him for 6 months near Turin. He's currently seeking further employment either in academia or science-adjacent tech.

Will's greatest strength and breadth of experience is in programming (primarily Python), for the purpose of data processing & analysis. His work within the ESA Gaia mission prepared him for dealing with Big Data of an unprecedented quality, performing queries via ADQL (SQL-like) with Python downstream work. He is highly familiar with SQL, and is comfortable constructing and maintaining databases. Python remains his favourite language and he takes a keen interest in learning & sharing best coding practices, especially in his data presentation work.

In recent years, Will has expanded his programming expertise to include web development, in order to present data in a fully interactive manner to the astronomical community. He has worked extensively with project versioning, both SVN & Git; which he finds exceptionally useful for both independent and collaborative work. For collaborative work, he takes an active senior role, supporting junior members whilst still managing project issues through GitHub. He also utilises project management strategies in his own research, such as sprint, through Jira. Will is an accomplished mathematician and employs higher level statistics in his research projects.

Will has presented science at both an expert and public (of all ages) level, delivering outreach for the university, emphasising his commitment to science communication. He has collaborated with European & North American colleagues both virtually and in person at conferences & visits. Right from the start of his PhD, Will has led or heavily contributed to the writing of multiple successful observation proposals. More recently, Will won a small personal grant through MW-Gaia, to allow him to visit collaborators in Madrid.

Will continues to teach data science, maths, programming & astrophysics to both undergraduates and postgraduates. He is very keen on teaching best practices, including documentation and ethics. He is a module leader who has been involved in the creation of course material with a high workload relating to the marking/grading of students. Will is a Fellow of Higher Education Academy, demonstrating a commitment to active learning.

EDUCATION

PhD in Astronomy; University of Hertfordshire	December 2023
Postgraduate Certificate in Higher Education; University of Hertfordshire	June 2023
2:1 MPhys in Astrophysics; University of Hertfordshire	June 2018
A-Levels; John Masefield Sixth Form	June 2014
GCSEs; John Masefield High School	June 2012

RELEVANT WORK EXPERIENCE

Lecturer University of Hertfordshire	Nov 2022 - Present
Visiting Lecturer University of Hertfordshire	Jan 2019 - Nov 2022
Outreach Presenter University of Hertfordshire	Nov 2018 - Nov 2022
Student Representative University of Hertfordshire	Sep 2017 - Jun 2018

SKILLS & INTERESTS

Research Experiences: In the last four years, research has involved deploying skills such as project management and communication; collaboration & coordination with multi-national teams: problem solving and independent research as well as comprehensive programming skills in multiple programming languages as indicated below.

Languages	Python, HTML, CSS, MATLAB, Javascript, ADQL (SQL), LaTeX, Java, PHP
Tools	Bash, Bokeh, Matplotlib, Numpy, Pandas, Astropy, Git, SVN

Interests: Hobby subjects include computer science & security, machine learning. Meanwhile, the research program has provided the opportunity to travel in Europe, enjoying new experiences and cultures: maintaining personal fitness via badminton, running, weightlifting, swimming and cycling.

PROJECTS

Gaia Ultracool Dwarf Sample IV. Optical Spectra of Gaia L Dwarfs (Cooper et al., *submitted*) Python, IRAF, Data Analysis, Astrophysics, Technical Writing

- Reduction of high quality spectroscopic data from the GTC with both IRAF & Python.
- Downstream analysis of data to retrieve astrophysical features.

Ultracool Spectroscopic Outliers in Gaia DR3 (**Cooper et al., *2023***) Python, ADQL, Java, Data Analysis, Astrophysics, Technical Writing

- Extraction and cross matching of high data volume via ADQL queries.
- Innovating with never-before-seen spectra to automatically classify subdwarfs.

Community Software Creation (Cooper, *2022a,b,c*) Python

- **Target list generator** – Automatically creating target lists with standards and finder charts for observation planning.
- **Radial Velocity Calculation** – A tool for using line centering and cross correlation to measure radial velocities.
- `gaiaxpy` **Batch** – Let a user download thousands of Gaia spectra at once and directly convert to fits or txt files.

Gaia Ultracool Dwarf Sample VII. Database (Cooper et al., *in prep*) Python, SQL, Astrophysics, Website Development

- Database creation, ingestion scripts and documentation.
- Creating the data visualisation on the **website**.

SIMPLE Database (Cruz et al., *in prep*) Python, Website Development

- Assisting with database creation and ingestion scripts; providing best coding practice advice.
- Leading the creation of the **website** for which to explore the database; including fully interactive plots.

Gaia Early Data Release 3: Gaia Catalogue of Nearby Stars (**Smart et al., *2021***) Python, ADQL, Java, Data Analysis, Astrophysics, Technical Writing

- Responsible for: simulated completeness; noting photometric issues; discussion on unexpectedly missing objects.
- Recreating all the plots from colleagues, regardless of sub-field, to create a homogeneous appearance.

Ultracool Dwarfs in Gaia DR3 & The L Dwarf Sample (**Sarro et al., *2023***; Smart et al., *in prep*) Python, ADQL, Data Analysis, Astrophysics, Technical Writing

- Providing the brand-new Gaia spectra and creating comparisons with ground-based spectra.
- Creating software for spectral typing and documenting internal Gaia processes.

Characterizing the Gaia radial velocity sample selection function in its native photometry (**Rybizki et al., *2020***) Python, Website Development, Technical Writing

- Creating interactive plots over two pages in an existing website to allow users to explore the full data set.
- Assisting with the technical writing as the only native English co-author.

Assorted Discovery Papers (**Mamajek et al., *2018***; **Gonzalez Egea., *2021***; **Faherty et al., *2022***; **Morris et al., *2022***) Astronomy, Astrophysics, Technical writing

- Researching and writing competitive observational programmes.
- Providing observations at professional observatories of particular targets of interest.