Dr. Sam Grafton-Waters

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Summary

My interests have evolved over time and I am keen to apply my skills of data analysis, coding, and research into real world problems. I recently completed my PhD at Mullard Space Science Laboratory where I developed these essential qualities and presented my work in multiple formats from published works, conferences and seminars, to outreach teaching programs.

PhD

Mullard Space Science Laboratory, UCL **September 2017 - February 2022**

Throughout my PhD I collaborated with many academics on an international scale, communicating and discussing research ideas and projects. I have led projects and met my deadlines through careful planning and organisation. As challenges occurred, I drew on my resilience and applied a considered approach to find the best solution.

- **Thesis Title:** *Exploring Photoionised Outflowing Winds in Active Galactic Nuclei*
- **Supervisors:** Prof. Graziella Branduardi-Raymont and Prof. Mathew Page

The list of my publications can be found at: ADS

Undergraduate Degree

University of Leicester **October 2013 - July 2017**

MPhys Physics with Astrophysics *First Class with Hons*

A-levels

John Masefield High School and Sixth Form College **September 2011 - June 2013**

Maths: A; Chemistry: B; Physics: C

Outreach

Nov 2020 - present

ORBYTS

- Created and developed projects in which sixth form students analyse real XMM-Newton data of an individual active galactic nucleus
- Written Python codes for the students to model the X-ray spectra
- Presented and explained complex black hole physics to the students
- Published our findings in Research Notes of the American Astronomical Society; the students were co-authors
- The code can be found on my Github page: github.com/samgraftonwaters/ORBYTS

Partner School	**Date**
Nottingham University Academy of Science and Technology (NUAST)	Nov 2020 - May 2021
NUAST and Nottingham High School	Feb 2022 - present

Workshops and Training Sessions

- Attended a public engagement workshop in January 2020
- Attended training sessions in how to plan, develop and teach outreach projects to students in Feb and April 2021

Seminar Organiser

Sept 2019 - Dec 2020

- Organised and was responsible for the weekly seminars held for external speakers.
- I identified that there was a gender discrepancy with previous speakers. Under my leadership, the ratio for male to female speakers decreased from 5:2 (averaged from 2016 - 2019) to 1:1 (averaged

for 2020 - 2021).
- During the COVID-19 pandemic, I adapted these seminars, by using Zoom, which proved beneficial because it enabled me to invite speakers who would other wise have been unable to participate, especially international scientists.

Key Skills

- **Programming:** *Python*, *R*
- **Spectral Codes:** `SPEX`, `XSPEC`
- **Website Design:** *HTML*, *CSS* **My Website:** samgraftonwaters.github.io
- **Document processors:** `LATEX`, Microsoft Office
- **Communication Platforms:** Zoom, Microsoft Teams

Talks and Presentations

The Obscuration Transient Event in NGC 3227 during 2019 **26th May 2022**
New Results in X-ray Astronomy Meeting 2022 *Leicester, UK*

Transient Obscuration Event in NGC 3227 during 2019 **24th February 2022**
Seminar *MSSL, UK*

Origin of the X-ray Narrow Line Region **9th September 2021**
Accretion Disk Winds Conference *Durham, UK (Remote)*

Outflowing winds of Active Galactic Nuclei **10th December 2020**
Seminar *Leicester, UK (Remote)*

Photoionisation Modelling of the Emission Line Regions in AGN **10th October 2019**
Seminar *MSSL, UK*

Photoionisation Modelling of the Emission Line Regions in NGC 7469 **4th September 2019**
New Results in X-ray Astronomy 2019 Conference *MSSL, UK*

Poster Presentation **15th July 2019**
Xcalibur: Next generation X-ray spectroscopy *Winchester, UK*

Proposals

I submitted a research proposal for 20th XMM-Newton Announcement of Opportunity study the AGN NGC 5643 for 2021/22 observations. I led and wrote the proposal, implementing the science goals and data analysis, as well as working with some collaborators to make sure the proposal was valid. The proposal was accepted.

Certificates and Memberships

- **Child Protection in Education - Level 2** **Awarded:** 8 March 2021
- **Fellow of the Royal Astronomical Society** **Elected:** February 9th, 2018

Blog Articles

I have written two blog articles for the MSSL astronomy website:
- **Journey to the Centre of a Galaxy: Active Galactic Nuclei** - Described what supermassive black holes are and explained the impact my research has on understanding such complex objects. Link
- **XMM-Newton: 20 Years and Counting** - Celebrating the 20th anniversary of XMM-Newton. Link

Further Interests

- **Cricket** - I have been a member with Cheltenham and Cranleigh cricket clubs. I have captained a number of different teams, which has enhanced my team work, tactical planning and, management under pressure skills.
- **Keen guitarist** - allows me to be patient when learning something new.

References

Graziella Branduardi-Raymont	Primary Supervisor	g.branduardi-raymont@ucl.ac.uk
Mathew Page	Secondary Supervisor	m.page@ucl.ac.uk
Mark Cropper	Head of Astro Group	m.cropper@ucl.ac.uk