

Carys J. E. Gilbert

Phone:

+27 72 241 5354

Email:

carysgilbert93@gmail.com

Address: 15 Mount Road,

Cape Town, South Africa, 7700

EDUCATION

MSc. by Dissertation - Astronomy | 2025-2026

University of Cape Town, South Africa

- Thesis Title: X-Ray and Full-Spectrum SED Analysis of 12MGS Galaxies in the Southern Sky
- Supervisors: Dr Lucia Marchetti (UCT), Dr Luigi Barcheisi (UCT), Prof. Carlotta Gruppioni (INAF-OAS), and Prof. Mattia Vaccari (UCT)

BSc. Hons. - National Astrophysics and Space Science Programme | 2024

University of Cape Town, South Africa

- Relevant Coursework: Electrodynamics, Astrophysical Fluid Dynamics, Spectroscopy, Optical and Radio Observational Techniques, Stellar Astrophysics, Galactic and Extragalactic Astrophysics, Cosmology, Spectroscopy
- Graduated with distinction (87%) for both the coursework and dissertation components
- Awarded the AST4007W Class Medal for the highest mark of all students in the 2024 NASSP Programme

BSc. - Astrophysics and Physics | 2021-2023

University of Cape Town, South Africa

- Relevant Coursework: Stellar Astrophysics, Galactic and Extragalactic Astrophysics, Special Relativity, Thermodynamics, Electromagnetism, Quantum Mechanics, Particle Physics, Nuclear Physics, Solid State Physics, Classical Mechanics
- Graduated with distinction (79%) in Astrophysics

PUBLICATIONS

Beyond the Dot: an LRD-like nucleus at the Heart of an IR-Bright Galaxy and its implications for high-redshift LRDs

P. Rinaldi, G.H. Rieke, Z. Wu, **C.J.E. Gilbert** et al.

Submitted to APJ, in review

arXiv: <https://arxiv.org/abs/2507.17738>

A New Hope for AGN SED Fitting: X-Ray Spectral Analysis of 12MGS AGN with the C2PO-Torus Model

C.J.E. Gilbert et al.

In prep, undergoing internal review

Presenting the work of my Honours thesis and my ongoing Master's thesis. This paper will focus on the X-ray spectral analysis of 43 AGN that are part of the 12-Micron Galaxy Sample of IR-bright galaxies. We will also present a new physically-based X-ray spectral model, C2PO-Torus, that is used to assist with SED fitting. Expected to be submitted to MNRAS in January 2026.

RESEARCH PROJECTS

X-Ray and Full-Spectrum SED Analysis of 12MGS Galaxies in the Southern Sky

Master's Thesis, 2025-2026

- Continuing the work of my Honours thesis by repeating the analysis for the remaining 31 12MGS AGN within the Southern Sky for which we have full MeerKAT and SALT coverage
- Completing X-ray spectral analysis with physically motivated models for the entire sample of 43 sources to determine intrinsic AGN parameters
 - Visited Prof. Cristian Vignali at the University of Bologna in June 2025 to learn about physical modelling techniques
- Completing radio spectral analysis using the MeerKAT data to create full spectrum SEDs
- Intention to submit the X-ray analysis results for publication before the end of 2025, and the SED fitting results by mid 2026

X-Ray and SED Analysis of Local 12 μ m Galaxies

Honours' Research Thesis, 2024

- Supervisors: Dr Lucia Marchetti and Dr Luigi Barchiesi
- Used archival Chandra and NuSTAR data to produce X-ray spectra of 12 galaxies selected from the 12MGS galaxy sample
- Determined the intrinsic X-ray luminosity of the central AGN using XSPEC
- Used the results to produce SED fits of the galaxies using the CIGALE software
- Found that including the X-ray data increased the quality of the fits, especially for obscured AGN, and allowed to greater precision in determining galactic parameters such as stellar mass and AGN fraction
- Achieved 96% overall

Long-Term Study of the Gamma-Ray Binary LS I +61° 303

3rd-Year Physics Capstone Project, 2023

- Supervisor: Dr Itumeleng Monageng
- Re-reduced and analysed optical spectra spanning 3 years from the Liverpool Telescope to find radial velocities of the system
- Used Keplerian fitting to determine the system's orbital parameters. Ultimately concluded that the companion is likely to be a black hole given the unknown orbital inclination
- Achieved 78% overall

CONFERENCES AND PRESENTATIONS

SARAO Postgraduate and Postdoctoral Research Conference | 2025

- Presented a poster on my Master's research

ISARP RADIOMAP Workshop | 2025

- Member of the LOC - <https://idia.ac.za/isarp-radiomap-2025-soc-loc/>

University of Bologna - Extragalactic Research Group | 2025

- Presented ongoing research at the weekly extragalactic research group meeting at the University of Bologna

SUCCESSFUL PROPOSALS

Nuclear Spectroscopic Telescope Array (NuSTAR) Cycle 11 | 2025

IRAS 03450+0055: An Unexplored Local Mid-Infrared Bright AGN

- Proposal Number 11077, P.I. C. Gilbert, 20ks awarded
-

AWARDS

- 2025 SA College Croll Scholarship awarded for achieving an Honours degree with distinction
- South African Radio Astronomy Observatory 2024 Honours Scholarship and 2025 Master's Scholarship
- 2024 AST4007W Class Medal for the highest overall mark
- Astronomical Society of Southern Africa's 2023 Cooke Scholarship for Studies in Astronomy
- Dean's Merit List for achieving a weighted course average above 70%, University of Cape Town, 2022-2023

WORK EXPERIENCE

Course Tutor for NASSP Honours | 2025

University of Cape Town

- Tutor for the Observational Techniques 2 - Radio Astronomy module for the National Astrophysics and Space Science Program Honours course
- Responsible for organising and running weekly tutorial sessions
- In charge of marking all assignments

Course Tutor for 2nd Year Astrophysics | 2025

University of Cape Town

- Tutor for the AST2004H 2nd-Year Astrophysics course
- Responsible for organising and running weekly tutorial sessions
- In charge of marking all assignments and the oral examinations

Internship at SAAO/SALT | 2023

Completed a 3-week internship at the South African Astronomical Observatory

- Main project was the conversion of the Java Visibility tool to a Python library
- Culminated in a 3-day excursion to Sutherland and the Southern African Large Telescope to observe operations and changing of instruments

Private Tutoring | 2021 Onwards

- Tutoring High School Mathematics, Physical Sciences and Accounting

TEACHING AND SUPERVISING EXPERIENCE

Co-Supervisor for Honours Project | 2025

- Co-supervised an Honours student, Christiaan Schutte, during his 4th-year research thesis

Guest Lecturer for 2nd-Year Astrophysics | 2025

- Taught the "Milky Way" module for the 2nd-year AST2003H astrophysics course

VOLUNTEERING AND OUTREACH

Volunteer Coordinator for Soapbox Science Cape Town | 2024-2025

Part of the volunteering team for the 2024 event and volunteer coordinator in 2025

- In charge of selecting, training and coordinating all volunteers for the 2025 event
 - Conducted visitor counts and surveys throughout the event, and assisted with setting up and closing down the event, attracting visitors, and with speaker presentations and demonstrations
-

Curiosity Cube Demonstrator | 2024

Merck Curiosity Cube Demonstrator during UCT Science Outreach Week 2025

- Ran the demonstrations for groups of ~30 Grade 7 learners at a time
- Assisted with the setting up and closing down of the Cube each day

Ambassador and Volunteer at the International Astronomical Union General Assembly | 2024

Part of the IAU GA 2024 volunteer team based in Cape Town

- Assisted with public relations, technical equipment, and management of delegates
- Responsible for the allocation and organisation of e-posters across the entire conference
- Was in charge of the conference Virtual Reality booth

Speaker for Women in Tech South Africa | 2024

- Was invited to give a presentation on South African astronomy and my journey as a woman in STEM, alongside the SpaceX astronaut Dr Sian Proctor

Presenter for Girls in Robotics Africa | 2024

- Was invited to give a presentation on astronomy and spectroscopy to girls aged 12-17 as part of their STEM education and mentoring program

LEADERSHIP POSITIONS AND EXPERIENCE

Co-Chair of the UCT Astronomy Outreach Society | 2025

- Help to organise and run the open days and job shadowing programs for local high school students

Vice-President of the UCT Society for Physics Students | 2023

- Organised social and educational events for students and members of staff

Class Representative | 2023

- PHY3004W: Advanced Physics
- AST3002F: Stellar Astrophysics
- AST3003S: Galactic and Extragalactic Astronomy

SKILLS AND ABILITIES

- Proficient in Python, including the Astropy, scipy and matplotlib libraries
- Experience in conducting observations using optical, spectroscopic, and radio telescopes
- Experience in processing and analysing optical (photometric and spectroscopic), radio and X-ray astronomical data
- Completed the National Institute for Theoretical and Computational Science (NITheCS) MUST 5 Day Deep Learning Bootcamp
- Proficient in LaTeX

REFERENCES

University of Cape Town

- Dr Lucia Marchetti (Senior Lecturer) - lucia.marchetti@uct.ac.za
- Dr Luigi Barchiesi (Post-Doc) - luigi.barchiesi@uct.ac.za
- Dr Itumeleng Monageng (Senior Lecturer) - itumeleng.monageng@uct.ac.za

University of Bologna

- Prof Cristian Vignali (Associate Professor) - cristian.vignali@unibo.it

SAAO

- Prof Rosalind Skelton (SAAO Managing Director) - ros@sao.co.za
 - Dr Lisa Crause (SALT Observatory Scientist) - lisa@sao.co.za
-