Curriculum Vitae of Jayde Willingham

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EDUCATION

Master of Research, Physics and Astronomy
Macquarie University, Sydney Australia
February 2025 - November 2025
Topic: Refining Dust Extinction Corrections for Hα Luminosity Functions using radio-based calibration
Supervisor: Dr Andrew Hopkins

Bachelor of Philosophy, Physics and Astronomy
Macquarie University, Sydney Australia
February 2024 - November 2024 Completion with Distinction

Bachelor of Mathematics, Pure and Applied Mathematics
University of Newcastle, Newcastle Australia
February 2020 - November 2023 Completion with Distinction

Bachelor of Science, Physics
University of Newcastle, Newcastle Australia
February 2020 - November 2023 Completion with Distinction

RESEARCH EXPERIENCE

ESO Summer Research Programme
Supervisor: Martyna Chruslinska and Mirko Curti June 2025 - August 2025

- Over this 6-week project, I contributed to investigating the growth of dense stellar systems throughout cosmic time by developing and testing semi-empirical models of cluster evolution and their influence on the cosmic star formation history. One of seven chosen out of 484 applicants.

CSIRO Studentship
Supervisor: Dr Maxim Voronkov November 2024 - February 2025

- We investigated the hyperfine structures of methanol masers in observational radio data. Our work included simulating these structures, modeling the data, and applying statistical analyses to better understand these poorly characterized features and their potential implications.

Bachelor of Philosophy Research
Supervisor: Professor Andrew Hopkins 2024

- This study quantifies uncertainties, evaluates the robustness of star formation rate (SFR) calculations, and compares their performance to model-derived SFRs, highlighting areas for improvement within the field.

Bachelor of Philosophy Research
Supervisor: Dr Tayyaba Zafar 2024

- We explored the viability of using observational radio fluxes from star-forming galaxies to constrain spectral energy distribution models, enabling improved parameter estimation.

University of Newcastle Summer Research
Supervisor: Associate Professor Karen Livesey 2023

- A computational study of the properties of multi-level antiferromagnetic spin systems, involving the derivation of system equations and their analysis using MATLAB.

Undergraduate Research
Supervisor: Associate Professor Lachlan Rogers 2022

- Here we investigate how the laser power dependence affects the photon auto-

correlation time scales in the $g^{(2)}(\tau)$ function in order to make steps towards creating a rigorous model for analysing NV centres.

PUBLICATIONS

J. Willingham, A. Hopkins, T. Zafar, J. Afonso, U. T. Ahmed, A. Ahmad, A. Battisti, D. Bomans, M. J. I. Brown, M. Cowley, D. Farrah, T. J. Galvin, B. Holwerda, D. Leahy, U. Maio, T. Mukherjee, J. Prathap, N. Seymour, J. Th. van Loon, and E. Ward, *"EMU/GAMA: Refining Dust Extinction Corrections for Hα Luminosity Functions Using Radio-Based Calibration."*, (submitted; 2025).

J. Prathap, A. M. Hopkins, R. Carvajal, M. Cowley, S. M. Croom, D. Farrah, I. Prandoni, S. S. Shabala, J. Th. van Loon, C. Pappalardo, K. A. Pimbblet, U. T. Ahmed, M. Bilicki, M. J. I. Brown, D. Leahy, A. Mailvaganam, J. R. Marvil, T. Mukherjee, S. F. Rahman, T. Vernstrom, **J. Willingham**, and T. Zafar, *"EMU/GAMA: A statistical perspective on active galactic nuclei diagnostics."*, (submitted; 2025).

J. Prathap, A. M. Hopkins, J. Afonso, M. Bilicki, M. Cowley, S. M. Croom, Y. Gordon, S. Phillipps, E. M. Sadler, S. S. Shabala, U. T. Ahmed, S. Amarantidis, M. J. I. Brown, R. Carvajal, D. Leahy, J. R. Marvil, T. Mukherjee, **J. Willingham**, and T. Zafar, *"EMU/GAMA: A new approach to characterising radio luminosity functions."*, arXiv:2505.11453 (2025).

TEACHING EXPERIENCE

Casual Academic 2023 - present
PHYS1205 - Fundamentals of Engineering Physics
PHYS1210 - Advanced Physics I
PHYS1200 - Introductory Physics for the Life Sciences
STAT2110 - Engineering Statistics
School of Information and Physical Sciences, University of Newcastle

- Taught physics problem-solving strategies to classes of 15–40 students, emphasizing conceptual understanding, logical reasoning, and mathematical techniques.
- Collaborated with the course coordinator to develop and tailor learning materials aligned with course objectives.

PHYS1510 - Engineering Physics
School of Mathematical and Physical Sciences, Macquarie University

Laboratory Demonstrator 2022 - present
PHYS1205 - Fundamentals of Engineering Physics
PHYS1210 - Advanced Physics I
PHYS1250 - MRS Physics and Radiation Protection
ENVS1002 - Physical and Chemical Environmental Systems
School of Information and Physical Sciences, University of Newcastle

- Led classes of 10–50 students through experimental procedures, providing clear explanations of fundamental physics and mathematics concepts.
- Evaluated and graded lab workbooks and reports, ensuring consistent feedback to support student learning and improvement.

PHYS1210 - Physics for the Life Sciences
School of Mathematical and Physical Sciences, Macquarie University

Course Development 2025 - present
EPPHYS152 - Physics Essentials
EPPREP970 - Physics for Medical Radiation and Health Sciences *School of Information and Physical Sciences*, University of Newcastle

- Developed course notes and materials
- wrote and recorded 2-5 minute content videos
- Organising content in Canvas and 5-HTP

AWARDS

JADC Travel Grant, Swinburne University 2025
Research Poster Excellence Award, Australian Institute of Physics 2025
Research Excellence Scholarship, Macquarie University Jan - Nov 2025
High Achiever - Research Communications, Macquarie University 2024
Summer Research Scholarship, University of Newcastle Dec 2022
College Commendation List, University of Newcastle 2020 & 2021

OUTREACH AND COMMUNICATION

Astronomy Open Night Talk, Macquarie University 2025
The Quantum Experience Presenter 2025
Children's University Educator 2023 & 2024
ExperimentFest Educator 2024
HunterWISE Women in STEM Mentor 2022
UoN Undergraduate Project Colloqium, University of Newcastle October 2022
MQ BPhil Project Conference, Macquarie University May & October 2024

TECHNICAL SKILLS

Languages : Python, R, MATLAB, Mathematica, C.
General : Proficient in Microsoft/Google suites, Spyder and Jupyter notebooks, LaTeX, github, report writing, audio/visual editing, graphic design, Windows Subsystem for Linux.

CERTIFICATION

Quantum Global Womanium 2023, Womanium 2023
Certificate III in Travel, Tourism & Events, Tafe NSW 2018