A. MAKAI BAKER

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EDUCATION

Monash University (Australia) 2021 - 2024
BSc. Advanced Research (Honours), Physics and Pure Mathematics
Weighted Average Mark (WAM): 90%
GPA: 3.97/4.0
First Class Honours
J. L. Williams Honours Scholar
Dean's List (2023, 2024)

AWARDS AND SCHOLARSHIPS

Rodney L. Turner Prize Dec 2024
Dept. of Physics & Astronomy, Monash University
Awarded to the student with the best Honours thesis.

J. L. Williams Honours Scholarship Feb 2024
Dept. of Physics & Astronomy, Monash University
Awarded to the top 3 students admitted to the School of Physics and Astronomy Honours degree.

Undergraduate Research Fellowship Jan 2024 - Feb 2024
Harvard-Smithsonian Centre for Astrophysics
Stipend to cover flights and living expenses for the duration of a research fellowship.

William A. Rachinger Prize Dec 2023
Dept. of Physics & Astronomy, Monash University
Awarded to the top student in experimental physics.

Undergraduate Research Experience Scholarship Dec 2022 - Feb 2023
Dept. of Physics & Astronomy, Monash University
Competitive scholarship to fund a summer vacation research project.

Undergraduate Research Experience Scholarship Nov 2022 - Jan 2023
Dept. of Physics & Astronomy, University of New South Wales
Competitive scholarship to fund a summer vacation research project.

Undergraduate Research Experience Scholarship Nov 2021 - March 2022
Dept. of Physics & Astronomy, Monash University
Competitive scholarship to fund a summer research project.

Dean's List Award 2023 and 2024
Faculty of Science, Monash University
Prestigious award granted to students enrolled in a Science program who have attained a minimum of a distinction grade as well as a weighted average of at least 85 per cent across all science units completed in the previous year.

PUBLICATIONS

Authors listed in order of contributions.

[1] **A. M. Baker**, E. Thrane, P. Lasky, et al. (APJS)
GWCloud: a searchable repository for the creation and curation of gravitational-wave inference results (2023)
DOI: 10.3847/1538-4365/acc938

[2] N. Sahu et al. (including **A. M. Baker**) (APJ)
AGEL: Is the Conflict Real? Investigating Galaxy Evolution Models using Strong Lensing at $0.3 < z < 0.9$ (2024)
DOI: 10.3847/1538-4357/ad4ce3

[3] **A. M. Baker**, E. Thrane, P. Lasky, J. Golomb (in preparation)
Can we do accurate astrophysical inference with next-generation gravitational-wave observatories?

[4] T. Barone et al. (including **A. M. Baker**) (in preparation)
The AGEL Survey Data Release 2: A Gravitational Lens Sample for Galaxy Evolution and Cosmology.

RESEARCH PROJECTS

1. **Limits to Reduced Order Modelling of Gravitational Wave Signals** 2024
Dept. of Physics & Astronomy, Monash University
Supervisors: Eric Thrane, Paul Lasky
Discovered that reduced order modelling fails to approximate low-frequency gravitational wave signals. Built reduced order models that include a number of detector effects for the first time. Developed generalised reduced order modelling code and gravitational-wave specific pipeline.

2. **Analysis of Lensing Models using Machine Learning (See publication [2])** 2024
Harvard-Smithsonian Centre for Astrophysics
Supervisor: Kim-Vy Tran
Applied machine learning methods to Hubble Space Telescope imaging to analyse gravitationally lensed galaxies.

3. **Localisation of Binary Neutron Star Mergers with Third Generation Gravitational Wave Detectors** 2023
Dept. of Physics & Astronomy, Monash University
Supervisors: Eric Thrane, Paul Lasky
Keywords: binary neutron star mergers, sky localisation, next-generation detectors.

4. **Using an Aligned Spin Model to Investigate the Distribution of Spins in Binary Black Holes** 2022-2023
Dept. of Physics & Astronomy, Monash University
Supervisors: Eric Thrane, Paul Lasky
Keywords: black hole spins, physical models, Bayesian inference.

5. **Illuminating the Dark Universe with Gravitational Lensing (See publication [2])** 2022-2023
School of Physics, University of New South Wales
Supervisor: Kim-Vy Tran
Reduced images from the Hubble Space Telescope to determine galaxy scaling relationships. Used Ppxf to extract velocity dispersions and other galactic kinematics from gravitational lens deflectors.

6. **Gravitational Waves from Fundamental Symmetry Breaking** 2022-2023
Dept. of Physics & Astronomy, Monash University
Supervisor: Csaba Balazs
Keywords: electroweak phase transition, first order symmetry breaking, gravitational waves.

7. **GWCloud: a Searchable Repository for the Creation and Curation of Gravitational-Wave Inference Results (See publication [1])** 2021-2022
   Dept. of Physics & Astronomy, Monash University
   Supervisors: Eric Thrane, Paul Lasky
   Aided in the development of GWCloud and utilised its API to analyse properties of binary black holes.

8. **A Net Zero Carbon Monash** 2022
   Faculty of Science, Monash University
   Supervisors: Vanessa Wong, Su Li Yeoh
   Rectified holes in Monash University's roadmap towards net-zero by 2030.

LEADERSHIP EXPERIENCE

Science Future Leaders Program 2022 - 2023
Student Leadership Program
Science Future Leaders is a highly selective program at Monash University that aims to build the future leaders of science. I am deeply invested in engaging with the community to empower underrepresented people, and this program gave me a deep understanding of how leadership can be implemented to foster and enact change.

Monash Minds 2021-2022
Student Leadership Program
Member of Monash University's invite-only student leadership program.
It is designed as a 'development experience for students who have a focus on excellence, a passion for learning, and a commitment to community service.' (From Monash Minds website).

Monash Advanced Science & Science Student Scholars 2021
Primary Member of Advocacy Subcomittee
Lead the development of the Advocacy Subcomittee for the Monash Advanced Science & Science Student Scholars ($MASS^3$) club. The subcomittee is designed to handle grievances from students across the Science faculty at Monash University and establish a platform that enables student advocacy.

OUTREACH

Faculty of Science Honours Information Seminar 2024
Delivered a talk to prospective honours students in the Faculty of Science at Monash University.

WORK EXPERIENCE

Data Entry and Collection 2018 - 2021
School of Ecosystem & Forest Sciences, University of Melbourne
Assist in the maintenance and measurement of roughly 250 dendrometers in the Central Highlands as part of an ongoing research project.
Collaborate with PhD students on analyses of research data.
Reorganise and compile two decades of phenology data using Excel.

SKILLS

Python, Parallel computing, High Performance Computing (HPC), LaTex.