# Henry Rooney Morgan Zovaro — Curriculum vitae

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## Employment & education

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| *Employment* | **Postdoctoral researcher**<br>Australian National University, Australia | 09/2020– |
| | **Giant Magellan Telescope Integral Field Spectrograph Instrument Scientist**<br>Australian National University, Australia | 08/2019–08/2020 |
| *Education* | **PhD in Astronomy & Astrophysics**<br>Australian National University, Australia<br>*Thesis title:* Resolving Jet-Driven Feedback on Sub-kpc Scales<br>*Supervisory panel:* Prof. Robert Sharp, Prof. Geoff Bicknell, Dr. Nicole Nesvadba, Prof. Brent Groves, Dr. Dipanjan Mukherjee, Dr. Alexander Wagner | To be conferred 12/2020 |
| | **Bachelor of Engineering – Mechatronic (Space) (Hons) (1st Class)***<br>The University of Sydney, Australia<br>*Thesis title:* Cheaper, Simpler: Adaptive Optics on an FPGA<br>*Supervisory panel:* Dr. David Rye, Dr. Francis Bennet | 2015 |
| | **Bachelor of Science – Major: Physics***<br>The University of Sydney, Australia | 2015 |

## Research Experience

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| *Observing time awarded* | *Jet/ISM Interaction in the Core of the Giant Radio Galaxy ESO 422–G028* (2019, PI Riseley)<br>ANU 2.3 m Telescope/WiFeS (3 full classical nights) |
| | *Molecular gas content and jet feedback in the very nearby radio galaxy UGC 05771 at* $z = 0.025$ (2019, PI Nesvadba)<br>IRAM 30 m Telescope/EMIR (5.5 hr – Director's Discretionary Time) |
| | *Revealing radio jet and circumgalactic medium interactions at kpc-scales* (2018, PI Banfield)<br>ANU 2.3 m Telescope/WiFeS (6 full classical nights) |
| | *Catching feedback in the act at the sub-kpc scale* (2017, PI Zovaro*)<br>Keck/OSIRIS (1 full classical night) |
| *Observing experience* | Keck/OSIRIS (1 night); ANU 2.3 m Telescope/WiFeS (15 nights) |
| *Analysis & reduction experience* | Gemini/NIFS; Keck/OSIRIS; ANU 2.3 m Telescope/WiFeS; VLT/SINFONI |
| *Programming & software experience* | python (data reduction, numerical integration, line fitting, kinematic modelling)<br>C (instrumentation simulations, microcontroller programming, robotics)<br>IRAF (Gemini/NIFS data reduction)<br>MATLAB (numerical integration, AO system simulations) |
| *Instrumentation research experience* | Optical laboratory assistant, ANU (2018)<br>Throughput testing for the VELOCE spectrograph |
| | PhD student, ANU (2016)<br>Simulations, optical design & documentation for adaptive optics (AO) systems for satellite tracking; simulations for high-speed imaging |
| | Summer research scholar, ANU (2014–2015)<br>Designed, built & tested feedback system for laser beam alignment |

*awarded under previous name, A. M. Zovaro.

## Refereed Publications

1. **Zovaro, H. R. M.**; Sharp, R.; Nesvadba, N. P. H.; Kewley, L.; Sutherland, R.; Taylor, P.; Groves, B.; Wagner, A.; Mukherjee, D.; Bicknell, G. V.; *Unravelling the enigmatic ISM conditions in Minkowski's Object*, Monthly Notices of the Royal Astronomical Society, *in press*

2. **Zovaro, H. R. M.**; Nesvadba, N. P. H., Sharp, R., Bicknell, G. V., Groves, B., Mukherjee, D., Wagner, A. Y., *Searching for signs of jet-driven negative feedback in the nearby radio galaxy UGC 05771*, Monthly Notices of the Royal Astronomical Society, Volume 489, Issue 4, November 2019, Pages 4944–4961, *available: https://doi.10.1093/mnras/stz2459*

3. **Zovaro, H. R. M.**; Sharp, R.; Nesvadba, N. P. H.; Bicknell, G. V.; Mukherjee, D.; Wagner, A.; Groves, B.; Krishna, S., *Jets blowing bubbles in the young radio galaxy 4C 31.04*, Monthly Notices of the Royal Astronomical Society, Volume 484, Issue 3, April 2019, Pages 3393–3409, *available: https://doi.org/10.1093/mnras/stz233*

4. Andreoni, I.; Ackley, K.; Cooke, J.; [and 122 others, including **Zovaro, H. R. M.**], *Follow Up of GW170817 and Its Electromagnetic Counterpart by Australian-Led Observing Programmes*, Publications of the Astronomical Society of Australia, Volume 34, id.e069 21 pp. (2017)

5. Bland-Hawthorn, J.; Maloney, P. R.; Stephens, A.; **Zovaro, A. M.**†; Popping, A., *In Search of Cool Flow Accretion onto Galaxies: Where Does the Disk Gas End?*, The Astrophysical Journal, Volume 849, Issue 1, article id. 51, 14 pp. (2017).

## Conference proceedings, other publications and papers in preparation

1. **Zovaro, H. R. M.**; Riseley, C. J., *Revisiting the Giant Radio Galaxy ESO 422–G028 II: optical follow-up with WiFeS*, in preparation

2. Riseley, C. J.; Galvin, T. J.; Keel, S., Duchesne, S. W.; Intema, H. T.; Anderson, C. S.; Heald, G., Hunstead, R. W.; Hurley-Walker, N.; O'Brien, A.; Koribalski, B. S.; Whiting, M.; **Zovaro, H. R. M.**, *Revisiting the Giant Radio Galaxy ESO 422–G028 I: Spectropolarimetric Properties of the Core/Jet System*, submitted to Publications of the Astronomical Society of Australia

3. Mannix, L.; **Zovaro, H. R. M.**. 'Absent stars blamed on plasma trail from distant galaxy's black heart', *Sydney Morning Herald*, April 22, 2019. *Available: https://bit.ly/2qCbQra*

4. Blakeslee, J.; Michaud, P.; O'Meara, S.; Urrutia, F.; **Zovaro, H. R. M.**, 'Bubble Blowing Black Hole Jets Impact on Galactic Evolution', Gemini Observatory Web Feature, February 6, 2019. *Available: http://www.gemini.edu/node/21159*

5. **Zovaro, A. M.**†; Copeland, M.; Bennet, F; Sharp, R., *Lucky Imaging of Low Earth Orbit Satellites*, The Australian Optical Society News, Volume 31, Issue 1, 2017

6. **Zovaro, A. M.**†; Bennet, F.; Copeland, M.; Rigaut, F.; D'Orgeville, C.; Grosse, D., *Harnessing Adaptive Optics for Space Debris Collision Mitigation*, Proceedings of the Advanced Maui Optical and Space Surveillance Technologies Conference, held in Wailea, Maui, Hawaii, September 20-23, 2016, Ed.: S. Ryan, The Maui Economic Development Board, id.127

7. Copeland, M.; Bennet, F.; **Zovaro, A. M.**†; Riguat, F.; Piatrou, P.; Korkiakoski, V.; Smith, C., *Adaptive Optics for Satellite and Debris Imaging in LEO and GEO*, Proceedings of the Advanced Maui Optical and Space Surveillance Technologies Conference, held in Wailea, Maui, Hawaii, September 20-23, 2016, Ed.: S. Ryan, The Maui Economic Development Board, id.67

8. Vaccarella, A.; Sharp, R.; Ellis, M.; Singh, S.; Bloxham, G.; Bouchez, A.; Conan, R.; Boz, R.; Bundy, D.; Davies, J.; Espeland, B.; Hart, J.; Herrald, N.; Ireland, M.; Jacoby, G.; Nielsen, J.; Vest, C.; Young, P.; Fordham, B.; **Zovaro, A. M.**†, *Avalanche photo diodes in the observatory environment: lucky imaging at 1-2.5 microns*, Proceedings of the SPIE, Volume 9908, id. 99082X 8 pp. (2016)

9. **Zovaro, A. M.**†; Bennet, F.; Rye, D.; D'Orgeville, C.; Rigaut, F.; Price, I.; Ritchie, I.; Smith, C., *Simpler Adaptive Optics using a Single Device for Processing and Control*, Proceedings of the Advanced Maui Optical and Space Surveillance Technologies Conference, held in Wailea, Maui, Hawaii, September 15-18, 2015, Ed.: S. Ryan, The Maui Economic Development Board, id.104

†denotes publication under previous name, A. M. Zovaro.

## Talks and Presentations

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| *Invited talk* | Observatoire de la Côte d'Azur | 2020 |
| *Contributed poster* | GMTO 2019 Annual Science meeting, Carlsbad USA | 2019 |
| *Contributed talk* | 2019 ASA Annual Scientific Meeting, University of Queensland | 2019 |
| *Contributed poster* | *Are AGN Special?* workshop, Durham University | 2018 |
| *Contributed talk* | 2018 ASA Annual Scientific Meeting, Swinburne University | 2018 |
| *Contributed talk* | *From Black Hole to Environment* conference, ANU | 2017 |
| *Contributed talk* | 2017 ASA Annual Scientific Meeting, ANU | 2017 |
| *Invited talk* | 2017 AAO International Telescope Support Office symposium, ANU | 2017 |
| *Contributed talk* | 2016 Australian Institute of Physics Congress, Brisbane | 2016 |
| *Contributed poster* | 2016 Advanced Maui Optical and Space Surveillance Technologies conference, Wailea | 2016 |
| *Invited talk* | Gemini North Observatory, Hilo | 2015 |
| *Invited talk* | W. M. Keck Observatory, Waimea | 2015 |
| *Contributed poster* | 2015 Advanced Maui Optical and Space Surveillance Technologies conference, Wailea | 2015 |

## Scholarships, Awards and Prizes

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| Giant Magellan Telescope Organisation travel funding ($3000) | 2019 |
| John Shaw Scholarship ($6000) | 2018 |
| Vice-Chancellor's Travel Grants – Higher Degree Research ($1500) | 2018 |
| 2017 ASA Meeting Best Student Oral Presenation (runner up) ($200) | 2017 |
| RSAA Best Student Talk Prize | 2017 |
| Mount Stromlo Student Seminars Best Science Talk Prize | 2017 |
| Australian Postgraduate Award Scholarship ($26000 per annum for 3.5 years) | 2016 |
| RSAA PhD Top-up Scholarship ($6000 per annum for 3 years) | 2016 |
| Space Environment Research Centre Postgraduate Scholarship ($12000 plus $5000 in travel support) | 2016 |
| Watermark Intellectual Asset Management Seminar Prize – Space Engineering | 2015 |
| Space Environment Research Centre Undergraduate Scholarship ($5000) | 2015 |
| ANU Summer Research Scholarship ($1500 plus accommodation and travel support) | 2014 |
| University of Sydney School of Physics Summer Scholarship ($2838) | 2014 |
| National Information Communications Technology Australia Summer Research Scholarship ($5500) | 2012 |

## Teaching and Outreach

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| Science Mentor, McNamara-Saunders Astronomical Teaching Telescope program | 2018– |
| Tutor, Research School of Astronomy & Astrophysics, Australian National University<br>*ASTR3002/6002: Galaxies & Cosmology* (Prof. Kenneth Freeman, Dr. Christian Wolf)<br>*ASTR4006/8006: Galaxies* (Prof. Kenneth Freeman) | 2018–2020 |
| Tutor, Tjabal Indigenous Higher Education Centre, Australian National University<br>*ASTR3002/6002: Galaxies & Cosmology* (Prof. Kenneth Freeman, Dr. Christian Wolf)<br>*ASTR3007: Stars* (Prof. Helmut Jerjen)<br>*ASTR4006/8006: Galaxies* (Prof. Kenneth Freeman)<br>*ASTR4012/8002: Astrophysical Gas Dynamics* (A/Prof. Christoph Federrath) | 2018–2019 |
| Laboratory demonstrator, Physics Education Centre, Australian National University<br>*PHYS1101: Introduction to Advanced Physics 1* (Prof. Paul Francis) | 2017 |
| Researcher participant, Questacon 2017 STEM X Academy Researcher Round Robin | 2017 |
| Talented Student Program Showcase Project Mentor, The University of Sydney | 2015 |

## Professional activities

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| Member of the Astronomical Society of Australia Early Career Researcher Steering Committee | 2020 |
| Student member, ANU 2.3 m Telescope Time Allocation Committee | 2019 |
| Member of Radio Galaxy Zoo | 2018– |
| Member of the Astronomical Society of Australia | 2018– |
| Member of 2017 Mount Stromlo Student Seminars Local/Scientific Organising Committee | 2017 |