ANDREW G FULLARD

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EMPLOYMENT

2022- **Research Consultant**
Michigan State University, East Lansing, MI
Institute for Cyber-Enabled Research

2020-2022 **Postdoctoral researcher**
Michigan State University, East Lansing, MI
TARDIS supernova radiative transfer software management and development
Advisor: Dr Wolfgang Kerzendorf

EDUCATION

2020 **Ph.D in Physics**
University of Denver, Denver, CO
Thesis: A Spectropolarimetric Study of Southern WR+O Binaries
Advisor: Dr Jennifer L Hoffman

2014 **MPhys 1st class Physics with Astronomy**
Cardiff University, Cardiff, UK
Research focus: extragalactic astronomy

AWARDS AND PROPOSALS

2021	HST Proposal “Do subluminous Type Ia supernovae experience a near-infrared plateau?” PI O. Graur. Funded
2021	HST Proposal “A spectroscopic study of the Type Ia supernova near-infrared plateau.” PI O. Graur. Funded
2021	HST AR Theory proposal "Solving the Type Ia supernova progenitor mystery with late-time light curve modeling of HST photometry." Funded, $241689
2020	AAS International Travel Grant, IAU 360, Hiroshima, Japan (conference canceled due to COVID-19)
2020	NSF AAG research grant proposal, “Lifting the veil on Wolf-Rayet rotation using wind structure: Multi-wavelength and Spectropolarimetric Approaches” – PI R. Ignace, A. Fullard primary science. Funded, $300,000
2019	Natural Sciences and Mathematics Dissertation Fellowship, University of Denver
2019	Chambliss Graduate Student poster Honorable Mention, 233rd AAS Meeting, Seattle, USA
2017	Outstanding paper award, APS 4 Corners Meeting, Fort Collins, USA
2017	Graduate Students of the Four Faculties Conference and research grant, University of Denver
2016	Outstanding teaching assistant award, Department of Physics & Astronomy, University of Denver
2014 – 2015	Dean’s Fellowship, University of Denver
2013 – 2014	Summer undergraduate research grant, Cardiff University

RESEARCH EXPERIENCE

- Machine learning (TensorFlow, statistics)
- Spectropolarimetric data analysis (analytical, computational)
- Computational radiative transfer modelling (supernovae, binary stars, circumstellar material, polarimetric)
- Observational data reduction (spectropolarimetric, far-infrared)
- Far-infrared data analysis (statistics)
- Extragalactic source analysis (morphology, statistics)

REFEREED PUBLICATIONS

2022 **Fullard, A. G.,** O'Brien, J. T., Kerzendorf, W. E., et al.
New mass estimates for massive binary systems: a probabilistic approach using polarimetric radiative transfer. Accepted to ApJ

2021 Richardson, N. D., Lee, L., Schaefer, G., […] **Fullard, A.G.** et al.
The First Dynamical Mass Determination of a Nitrogen-rich Wolf-Rayet Star Using a Combined Visual and Spectroscopic Orbit. AJ, 908, L3
Performed polarimetric model analysis

2021 O'Brien, J. T., Kerzendorf, W. E., **Fullard, A.,** et al.
Probabilistic Reconstruction of Type Ia Supernova SN 2002bo. ApJ, 916, L14
Provided software support and editing

2020 **Fullard, A. G.;** St-Louis, N.; Moffat, A. F. J.; Piirola, V. E.; Manset, N.; Hoffman, J. L.
A multi-wavelength search for intrinsic linear polarization in Wolf-Rayet winds. AJ **159** 5.

2019 Ueta, T.; Szczerba, R.; **Fullard, A. G.;** Takita, S.
On Surface Brightness and Flux Calibration for Point and Compact Extended Sources in the AKARI Far-IR All-Sky Survey (AFASS) Maps. PASJ **71** 5 (2019).
Provided statistical analysis of AKARI PSFs

2017 Lomax, J. R.; **Fullard, A. G.** et al.
The complex circumstellar and circumbinary environment of V356 Sgr. MNRAS **464,** 1936–1947.
Performed data analysis, preliminary data visualization

2017 Ueta, T. et al. (including **Fullard, A.**) Surface brightness correction for compact extended sources observed by the AKARI Far-Infrared Surveyor in the slow-scan mode. PASJ **69,** 11.
Provided statistical analysis of AKARI PSFs

2015 Eales, S.; **Fullard, A.** et al.
H-ATLAS/GAMA: quantifying the morphological evolution of the galaxy population using cosmic calorimetry. MNRAS **452,** 3489–3507.
Performed primary data analysis, target cross-matching, data visualisation

OTHER PUBLICATIONS

2021 St-Louis, N., Gayley, K., Hillier, D. J., […] **Fullard, A. G** et al.
Ultraviolet Spectropolarimetry with Polstar: Massive Star Binary Colliding Winds, whitepaper

2021 Peters, G. J., Gayley, K., Ignace, R., […] **Fullard, A. G.** et al.
Ultraviolet Spectropolarimetry with Polstar: Conservative and Nonconservative Mass Transfer in OB Interacting Binaries, whitepaper.

2020 Shrestha, M.; Neilson, H. R.; Hoffman, J. L.; Ignace, R.; **Fullard, A. G.**
Polarization simulations of stellar wind bow shock nebulae. II. The case of dust scattering. MNRAS

2019 Johnson, R. A.; **Fullard, A. G.;** Lomax, J. R.; Cooper, K.; Leon-Alvarez, D.; Hoffman, J. L.; Nordsieck, K. H.
A Comparison of the Well-constrained Geometry of V444 Cygni and Two Possible Analogs: WR 21 and WR 62a. RNAAS **3** 146

2019 Hoffman, J. L., **Fullard, A.,** Johnson, R. A.
Knowing the dancer from the dance: Line polarization simulations of colliding-wind binaries. AAS Meeting **233**, 448.06

2018 **Fullard, A. G.;** Hoffman, J. L.; DeKlotz, S.; Azancot Luchtan, D.; Cooper, K.; Nordsieck, K. H.
Spectropolarimetry of the WR + O binary WR 42. RNAAS **2**, 37.

2018 Hoffman, Jennifer L.; **Fullard, Andrew G.;** Nordsieck, Kenneth H.
Polarized light curves illuminate wind geometries in Wolf-Rayet binary stars. AAS Meeting **231**, 341.02

2017 Hoffman, J. L.; Ashley, S. F.; Ornelas, J. L.; **Fullard, Andrew;** Lomax, J. R.; Shrestha, M.; Babler, B. L.; Bjorkman, J. E.; Bjorkman, K. S.; Davidson, J. W.; Meade, M.; Nordsieck, K. H.; Richardson, N.
The Distorted Winds of V444 Cygni: New Insights from Spectropolarimetry. AAS Meeting **229,** 344.02.

2017 **Fullard, A.;** Lomax, J. R.; Malatesta, M. A.; Babler, B. L.; Bednarski, D.; Berdis, J.; Bjorkman, K. S.; Bjorkman, J. E.; Carciofi, A. C.; Davidson, J. W.; Keil, M.; Meade, M.; Nordsieck, K. H.; Scheffler, M.; Hoffman, J. L.; Wisniewski, J. P.
The Complex Circumstellar and Circumbinary Environment of V356 Sgr. AAS Meeting **229,** 344.21.

2015 Ueta, T., **Fullard, A.** & Tomasino, R. L.
Planetary Nebulae from the AKARI Far-IR All-Sky Maps. EAS Publications Series **71,** 303–304.

PRESENTATIONS AND TALKS

*Received award

2022 Time Domain and Multi-Messenger Astrophysics NASA Workshop
Poster: Open source, open science: Radiative transfer software to interpret time domain and multiwavelength observations

2021 237th meeting of the American Astronomical Society, Virtual
Talk: Line polarization modeling of WR binary systems

2020 236th meeting of the American Astronomical Society, Madison, WI, USA
Dissertation talk: The Shape of Winds: Modeling the 3D structure of WR + O binary systems

2020 Astronomical Polarimetry 2020 (IAU 360), Hiroshima, Japan
Talk: Peeling Back the Layers: Variable Line Polarization in WR + O Binaries

2020 Liverpool John Moore's University, Astrophysics Institute, UK
Invited Colloquium: Spectropolarimetry of WR + O binaries with SALT

2020 Nottingham University, UK
Invited Colloquium: Spectropolarimetry of WR + O binaries with SALT

2019 STScI Spring Symposium, Baltimore, MD, USA
Poster: Spectropolarimetry of WR + O binaries with SALT

2019 233rd meeting of the American Astronomical Society, Seattle, WA, USA
***Poster: Spectropolarimetry of WR 113 and other WR + O binaries with SALT**

2018 Massive Stars and Supernovae, Bariloche, Argentina
Talk: Spectropolarimetry of WR + O binaries with SALT

2018 232nd meeting of the American Astronomical Society, Denver, CO, USA
Talk: Astronomy in Denver:
Spectropolarimetric Observations of 5 Wolf-Rayet Binary Stars with SALT/RSS

2017 Annual meeting of the APS Four Corners Section, Fort Collins, CO, USA
***Talk: Spectropolarimetry with SALT: New Observations of Wolf-Rayet Binaries**

2017 229th meeting of the American Astronomical Society, Grapevine, TX, USA
Poster: The Complex Circumstellar and Circumbinary Environment of V356 Sgr
2016 Colorado Science Conference for Professional Development, Denver, CO, USA
Talk: Improving Urban Astronomy Labs for Large Classes

TEACHING EXPERIENCE

2020- Mentor
Michigan State University, East Lansing, MI
Mentored Isaac Smith and Kevin Cawley to acquire summer funding via both NUMFocus and XSEDE Empower. Mentored both Isaac and Kevin during the academic year, and during summer 2021 as part of the Mid-SURE program at MSU.
Mentor to Jack O'Brien, MSU graduate student, assisting with proposal writing, paper writing and the development of research skills.

2015-2018, 2020 Teaching Assistant
University of Denver, Denver, CO
Developed laboratory experiments, prepared and ran laboratory classes, graded laboratory assignments, assisted professors with lectures and grading, improved organizational methods.

2015-2020 Undergraduate Mentor
University of Denver, Denver, CO
Assisted my Ph.D advisor with introducing undergraduate students to scientific research. Ran workshops to introduce them to programming and data analysis. Mentored Stella Yoos, Toni Panzera, Kevin Cooper, and Daniel Azancot-Luchtan in research methods and science writing.

TECHNICAL SKILLS

Fluent: Python, Fortran, LaTeX, Lua, git
Familiar: Unix, IDL

SERVICES

2022, subject-matter expert reviewer in a NASA peer review.
Referee for Astrophysical Journal
Administered and mentored as part of Google Summer of Code 2021
Poster evaluator at Mid-SURE 2021

MEMBERSHIPS

2017-present American Astronomical Society
2017-2018 American Physical Society