Patrick Armstrong

omegalambda.au | patrick.james.1998@gmail.com | OmegaLambda1998 | 0000-0003-1997-3649

Education

Doctor of Philosophy (Astronomy & Astrophysics) — Australian National University
February 2020 – Present

Bachelor of Science (Adv.) (Hon.) — Australian National University
Physics Major, Astrophysics Specialisation — *February 2016 – October 2019*

Academic Experience

DES Builder — Dark Energy Survey
Develop & maintain the Pippin pipeline, Internal review of DES papers, Organise & host meetings. *July 2023 – Present*

Infrastructure Lead — DEbass Survey
Develop & maintain the DEBass Survey database and website. *March 2021 – Present*

MSATT Student Mentor — MSATT
Provide guidance and mentorship for high-school students completing astronomical projects. *February 2020 – Present*

Astronomical Tutor — Australian National University
Sole tutor for Galaxies and Cosmology (ASTR3002). *July 2019 – October 2022*

Other Experience

Student Seminar Planning Committee Member — Australian National University
[2022]: Senior planning committee member, [2021]: Planning committee member *February 2021 – October 2022*

Mt. Stromlo Outreach Officer — Australian National University
Deliver high quality outreach experience for school groups and families *January 2018 – December 2022*

Astronomical Consultant
[2020] Research for Questacon's Australia in Space exhibition
[2019] Research for Penguin Random House's Stargazer publication
[2018] Research and preparation for ABC's Stargazing Live 2018
[2018] Building back-end code and moderation for the SkyMapper Citizen Science Project: Supernova Sighting

Questacon Staff — Questacon
[2019 – 2020] Learning Programs Presenter (APS 4)
[2016 – 2019] Questacon Assistant (APS 2)
[2015 – 2019] Gallery Assistant (APS 1)

Recognition & Distinctions

ANU 2.3m Observing Time — Siding Spring Observatory
The Ultimate Low-z Supernova Sample for Cosmology — *2023*

Alex Rodgers Travelling Scholarship — ANU College of Science
Travel to DES Collaboration Meeting 2022 — *2022*

Commendation for Excellence in Tutoring or Demonstrating — ANU College of Science
Tutoring Galaxies and Cosmology (ASTR3002) — *2022*

NCI ANU Merit Allocation Scheme — GADI
Forward Modelling Supernova Cosmology — *2021 – 2022*

Australian Government Research Training Program — Australian National University
PhD Scholarship — *2020 – Present*

RSAA Supplementary Scholarship — Australian National University
PhD Scholarship — *2020 – Present*

ANU Science, Health, and Medicine Honours Scholarship — Australian National University
Honours Scholarship — *2019*

ANU Summer Research Scholarship — Australian National University
Develop a TNS Bulk Report API for the SkyMapper Transient Survey — *2016*

Boyapti Computer Science and Mathematics prize for first year — Australian National University
Top grades in mathematics and computing — *2016*

Technical Skills

Python 3
Example Projects: Pippin Pipeline, Approximate Neyman Construction Cosmology Validator

Julia
Example Projects: Fit Type II Shock Cooling Lightcurves, Approximate SALT2/3 Simulations, Create JLA-like Covariance Matrices

HTML, CSS, & Javascript
Example Projects: DEBass Survey, Personal Website

Statistics
MCMC, ABC, and other Bayesian Inference, Frequentist Inference, Data Analysis, Data Visualisation

Publications

First Author

Probing the consistency of cosmological contours for supernova cosmology (doi: 10.1017/pasa.2023.40)
P. Armstrong, H. Qu, et. al. (2023); Publications of the Astronomical Society of Australia

SN2017jgh: a high-cadence complete shock cooling light curve of a SN IIb with the Kepler telescope (doi: 10.1093/mnras/stab2138)
P. Armstrong, B E. Tucker, et. al. (2022); Monthly Notices of the Royal Astronomical Society

Co-Author

[O ii] as an effective indicator of the dependence between the standardized luminosities of Type Ia supernovae and the properties of their host galaxies (doi: 10.1093/mnras/stae1996)
B. Martin, C. Lidman, ..., P. Armstrong, et. al. (2024); Monthly Notices of the Royal Astronomical Society

The Dark Energy Survey Supernova Program: Cosmological Analysis and Systematic Uncertainties (doi: 10.48550/arXiv.2401.02945)
M. Vincenzi, D. Brout, ..., P. Armstrong, et. al. (2024); arXiv e-prints

The Dark Energy Survey: Cosmology Results With 1500 New High-redshift Type Ia Supernovae Using The Full 5-year Dataset (doi: 10.48550/arXiv.2401.02929)
DES Collaboration, T. M. C. Abbott, ..., P. Armstrong, et. al. (2024); arXiv e-prints

Binning is Sinning: Redemption for Hubble Diagram Using Photometrically Classified Type Ia Supernovae (doi: 10.3847/2041-8213/ace34d)
R. Kessler, M. Vincenzi, ..., P. Armstrong, et. al. (2023); The Astrophysical Journal Letters

VizieR Online Data Catalog: SN 2018agk spectra and NIR-UV light curves (Wang+, 2021) (bibcode: 2023yCat..19230167W)
Q. Wang, A. Rest, ..., P. Armstrong, et. al. (2024); VizieR Online Data Catalog

Revealing the Progenitor of SN 2021zby through Analysis of the TESS Shock-cooling Light Curve (doi: 10.3847/2041-8213/acb0d0)
Q. Wang, P. Armstrong, et. al. (2023); The Astrophysical Journal Letters

Revealing Progenitor of SN 2021zby with Shock Cooling Light Curve from TESS (bibcode: 2023AAS...24110716W)
Q. Wang, P. Armstrong, et. al. (2024); American Astronomical Society Meeting Abstracts

Concerning colour: The effect of environment on type Ia supernova colour in the dark energy survey (doi: 10.1093/mnras/stac3711)
L. Kelsey, M. Sullivan, ..., P. Armstrong, et. al. (2023); Monthly Notices of the Royal Astronomical Society

The Dark Energy Survey supernova program: cosmological biases from supernova photometric classification (doi: 10.1093/mnras/stac1404)
M. Vincenzi, M. Sullivan, ..., P. Armstrong, et. al. (2022); Monthly Notices of the Royal Astronomical Society

Measuring Cosmological Parameters with Type Ia Supernovae in redMaGiC Galaxies (doi: 10.3847/1538-4357/ac8b82)
R. Chen, D. Scolnic, ..., P. Armstrong, et. al. (2023); The Astrophysical Journal

The Pantheon+ Analysis: Cosmological Constraints (doi: 10.3847/1538-4357/ac8e04)
D. Brout, D. Scolnic, ..., P. Armstrong, et. al. (2023); The Astrophysical Journal

The dark energy survey 5-yr photometrically identified type Ia supernovae (doi: 10.1093/mnras/stac1691)
A. Möller, M. Smith, ..., P. Armstrong, et. al. (2023); Monthly Notices of the Royal Astronomical Society

SN 2018agk: A Prototypical Type Ia Supernova with a Smooth Power-law Rise in Kepler (K2) (doi: 10.3847/1538-4357/ac2c84)
Q. Wang, A. Rest, ..., P. Armstrong, et. al. (2022); The Astrophysical Journal

Rates and delay times of Type Ia supernovae in the Dark Energy Survey (doi: 10.1093/mnras/stab1943)
P. Wiseman, M. Sullivan, ..., P. Armstrong, et. al. (2023); Monthly Notices of the Royal Astronomical Society

First Results of the SkyMapper Transient Survey (doi: 10.1017/S1743921318002077)
A. Möller, B. E. Tucker, ..., P. Armstrong, et. al. (2022); IAU Symposium

Spectroscopic classification of SN 2018bwp as a type Ia supernova a few weeks after peak brightness (bibcode: 2018ATel11671....1L)
A. Lopez-Sanchez, L. Galbany, ..., P. Armstrong, et. al. (2022); The Astronomer's Telegram

Spectroscopic classification of SN 2018bwq as a type Ia supernova a few days before maximum light. (bibcode: 2018ATel11667....1L)
A. Lopez-Sanchez, L. Galbany, ..., P. Armstrong, et. al. (2022); The Astronomer's Telegram

First Confirmed Supernova with the SkyMapper/Zooniverse Supernova Sighting Project (bibcode: 2017ATel10426....1T)
B. E. Tucker, A. Moller, ..., P. Armstrong, et. al. (2022); The Astronomer's Telegram

WiFeS Classification of SMT17kdl/SN2017edm as a Type Ia Supernova (bibcode: 2017ATel10444....1T)
B. E. Tucker, A. Moller, ..., P. Armstrong, et. al. (2022); The Astronomer's Telegram

DEbass Transient Classification Report (73 Reports)
B. Martin, P. Armstrong, ..., P. Armstrong, et. al.; Transient Name Server Classification Report

Transient Classification Report for 2021-10-12 (bibcode: 2021TNSCR3493....1L)
C. Lidman, M. Dixon, ..., P. Armstrong, et. al. (2022); Transient Name Server Classification Report

Classification of 11 supernovae by DEBass (bibcode: 2021ATel14925....1L)
C. Lidman, S. Dhaka, ..., P. Armstrong, et. al. (2022); The Astronomer's Telegram

SkyMapper Transient Discovery Report (15 Reports)
A. Moller, B. Tucker, ..., P. Armstrong, et. al.; Transient Name Server Discovery Report

Communication

SN2017jgh: a high-cadence complete shock cooling light curve of a SN IIb with the Kepler telescope
Over 180 items in print, radio, and online, across Australia and internationally
***Highlights:**, Al Jazeera, National Geographic Indonesia, Radio Canada, De Morgen, ABC Science online, The Guardian, Space Australia, Sky News Australia, 2GB and on the AAP wires*
2021

Conference Talks

CosmoPalooza — Invited Speaker
DES SN 5 Year Methodology & Results — *2023*

DES Collaboration Meeting — Invited Speaker
DES 5 year supernova analysis — *2020, 2021, 2022, 2023*

ASA Annual Science Meeting — Speaker
DES 5 year supernova analysis — *2020, 2021, 2022, 2023*

Kepler K2 Extra-galactic Data Analysis Meeting — Attendee
Investigating transients in Kepler's K2 survey — *2018*