

Simon J. Murphy

he/him/his

- Self-motivated, collaborative scientist with excellent communication skills
- Observational astronomer with extensive experience in all facets of photometric and spectroscopic observing, data reduction and analysis
- Experienced physics tutor and demonstrator, both in-person and online
- Skilled scientific programmer, including Python, databases and web applications

My research is focused on identifying and precisely characterising our young stellar neighbours, particularly at the lowest masses and youngest ages. These nearby stars provide unique tests of pre-main sequence stellar evolution and the late stages of circumstellar disc evolution, and are some of the best targets for directly imaging giant exoplanets.

Current Positions

- July 2020– **Casual Academic, School of Science, UNSW Canberra**
- Responsible for delivery of laboratory and tutorial classes for first-year physics students
 - Developed multiple research-driven undergraduate astrophysics labs
 - Supervised undergraduate research projects
- 2016– **Visiting Fellow, Research School of Astronomy & Astrophysics, ANU**
- Collaboration with ANU astronomers to spectroscopically confirm extremely metal-poor stars identified by the SkyMapper telescope
 - Notable discoveries of the lowest-known stellar iron abundance ([Nordlander et al. 2019](#)), and magneto-rotational hypernovae as r -process sites ([Yong et al. 2021 Nature paper](#))

Professional History

- 2019–2020 **Research Fellow, School of Science, UNSW Canberra (0.8x FTE)**
- Published work using eclipsing binaries to test pre-main sequence models ([Murphy et al. 2020](#))
 - Responsible for delivery of laboratory and tutorial classes for first-year physics students
 - Public talk at *Night with the Stars* event promoting space and astronomy at UNSW Canberra
- 2016–2019 **Vice Chancellor's Postdoctoral Research Fellow, School of Science, UNSW Canberra**
- 0.6x FTE 2017 Jul–Dec; 0.8x FTE 2018 Jan–2019 Aug
 - Developed efficient methods to identify young and low-mass stars from large catalogues in support of the (now postponed) *FunnelWeb* spectroscopic survey
 - Precisely characterised the prototype of newly-discovered 'Peter Pan' stars with long-lived circumstellar discs and accretion ([Murphy et al. 2018](#))
 - Awarded >60 nights on the ANU 2.3-m telescope for a variety of young star and collaborative projects; Co-Investigator on successful ALMA observing proposals
 - Presented research results at national and peak international conferences
- 2015 **SkyMapper Postdoctoral Fellow, Research School of Astronomy & Astrophysics, ANU**
- Led development of the *Virtual Observatory* software (SIAP, SCS, TAP) used by the SkyMapper team to distribute images and catalogues of the southern sky

- 2013–2014 **Gliese Fellow**, *Astronomisches Rechen-Institut*, University of Heidelberg, Germany
- Developed novel methods to identify new moving group members from astrometric databases, including those produced by the *Gaia* satellite
 - Published comprehensive work re-examining membership of the young ϵ Cha Association, which has become the reference for the field ([Murphy et al. 2013](#))
 - Collaboration with Max Planck Institute and NASA astronomers to spectroscopically confirm wide companions to young southern stars
- 2012 **Postdoctoral Fellow**, *Research School of Astronomy & Astrophysics*, ANU
- Member of the scientific commissioning team for the SkyMapper telescope and sky survey
 - Established online data archive for ANU 2.3-m telescope

Education

- 2007–2011 **Ph.D.**, *Australian National University*, Canberra, Australia (awarded July 13, 2012)
- thesis “*Revealing the Chamaeleon: Young, low-mass stars surrounding η and ϵ Chamaeleontis*”
- supervisor Professor Michael Bessell
- 2006 **B.Sc. (First Class Honours)**, *Australian National University*, Canberra, Australia
- thesis “*A large-scale survey for RR Lyrae stars in the Galactic halo*”
- 2003–2005 **B.Sc. (Astronomy)**, *University of Canterbury*, Christchurch, New Zealand

Research Outputs

Full publication list available at the end of this document

2008–	Refereed publications: 36 (8 first-author)	(all in SJR Q1 journals)
citations	1228	(via NASA Astrophysics Data System)
<i>h</i> -index	20	(<i>h</i> publications with at least <i>h</i> citations)

Research Interests

- Low-mass star formation and early stellar evolution
- Stellar age determination
- Accretion and circumstellar disc evolution
- Young eclipsing and wide binaries
- Star clusters, moving groups and associations
 - Innovative member selection (esp. at lowest masses)
 - Kinematics; dynamical evolution of young groups
 - Role in local star formation
- Data science; knowledge discovery from large data sets
- Scientific use of the *Virtual Observatory*
- Astrophysics with amateur-grade telescopes

Teaching & Mentoring Experience

Undergraduate teaching

- 2020–2021 ZPEM1501(2) *Physics 1A(B)*, UNSW Canberra
- Online and in-person delivery of tutorial and laboratory classes
 - Up to 4x2 hr labs and 4x1 hr tutorials per week for first-year students

- Produced weekly solution videos to aid student revision
- Rapidly adapted online and app-based labs to replace in-person teaching
- Lab, test and exam marking, as required

2020–2021 ZPEM2509 *Astrophysics*, UNSW Canberra

- Developed 3 hr lab sessions on the Sun and eclipsing binaries for second-year students
- Online delivery using multi-platform software and interactive Python notebooks

2021 ZPEM3528 *Nuclear Physics*, UNSW Canberra

- Developing new labs on Big Bang Nucleosynthesis and Nuclear Statistical Equilibrium for third-year students with Dr Ivo Seitenzahl

Mentoring & supervision

2021 Heidi Collins (ZPEM3532 *Advanced Topics* project, co-supervised with Warrick Lawson)
“Hunting for the dispersed population of low-mass stars around the young cluster η Cha”

2020 Jade Esler (ZPEM1901 *Contemporary Issues in Science*, 5 week research project)
“Modelling the young eclipsing binary THOR 42”

Selected Technical Skills

- Creation and exploitation of large astronomical databases
- Extensive programming experience (Python–expert, web, SQL, Perl, Javascript)
- Optical spectroscopy (low–high resolution)
- Integral-field spectroscopy and data reduction
- Optical imaging and photometry
- Synthetic photometry
- Astronomical data reduction packages (incl. IRAF, PyRAF, Figaro, astropy)
- Development and use of *Virtual Observatory* tools and services

Selected Awards & Prizes

2016–2019 Vice Chancellor’s Postdoctoral Research Fellowship, University of New South Wales

2013–2014 Gliese Postdoctoral Fellowship, University of Heidelberg

2012 Honourable mention, *ASA Charlene Heisler Prize* for best astronomy Ph.D. thesis

2011 Vice Chancellor’s Award for Community Outreach (Group), ANU

2007–2011 Joan Duffield Research Scholarship, ANU

Selected Colloquia, Talks & Tutorials

12/2019 **Contributed talk:** *“Precision testing of evolutionary models at low masses with pre-main sequence eclipsing binaries”*

Stars in Melbourne workshop, Monash University, Australia

11/2019 **Public talk:** *“A French philosopher’s guide to measuring the stars”*

ADFA Night with the Stars, Canberra, Australia

11/2018 **Contributed talk:** *“A rare, young M+M eclipsing binary in the 32 Ori Moving Group”*

Stars in Canberra workshop, UNSW Canberra, Australia

8/2017 **Invited talk and demonstration:** *“SkyMapper in the Virtual Observatory”*

ADACS Data Intensive Astronomy workshop, Melbourne, Australia

- 5/2015 **Contributed talk: “New low-mass members of Scorpius-Centaurus”**
IAU Symposium 314: Young stars and planets near the Sun, Atlanta, USA
- 4/2014 **Colloquium: “Adventures in young stellar associations”**
School of Physics, University of New South Wales, Sydney, Australia
- 4/2014 **Invited talk and tutorial: “SkyMapper in the Virtual Observatory: How will you access the terabytes?”**
SkyMapper: Everything you need to know to use the terabytes, Canberra, Australia
- 3/2014 **Invited tutorial: “Querying complex databases in the Virtual Observatory”**
Gaia and the Unseen: The Brown Dwarf Question, Torino, Italy

Selected Media

Various radio interviews, newspaper and online coverage, e.g.

- 7/2021 **“New type of massive explosion explains mystery star”**
<https://newsroom.unsw.edu.au/news/science-tech/new-type-massive-explosion-explains-mystery-star>
- 1/2016 **“Astronomers discover largest solar system”**
<https://www.bbc.com/news/science-environment-35420633>
- 9/2015 **“Red Dwarf stars point to planet formation”**
https://www.huffingtonpost.com.au/2015/09/17/red-dwarf-planets_n_8156242.html
- 7/2012 **“The mysterious case of the disappearing dust”**
https://www.nasa.gov/mission_pages/WISE/news/wise20120705.html
- 9/2011 **“Baby star found on Earth’s doorstep”**
<https://www.sciencemag.org/news/2011/09/baby-star-found-earths-doorstep>

Professional Service

- 2006– Member, *Astronomical Society of Australia*
 - Education & Public Outreach Chapter; Inclusion, Diversity & Equity in Astronomy (IDEA) Chapter
- 2015– Member, *International Astronomical Union*
 - Division C: Education, Outreach and Heritage; Division G: Stars and Stellar Physics
- 2015– Reviewer, *Monthly Notices of the Royal Astronomical Society*, *AAS Journals*, *Astronomy & Astrophysics*
- 2015–2016 Member, Technical Working Group, *Australian All-Sky Virtual Observatory*
- 2009–2012 Member, RSAA Data Archive Advisory Committee, ANU
- 2007–2012 Member, Mount Stromlo Student Outreach Group, ANU

References available on request

Refereed Publications

I am an author of **36** peer-reviewed articles (all in SJR Q1 journals), including **8 first-author** and **5 second-author** publications. Citations as indexed by the NASA Astrophysics Data System are correct as of July 18, 2021. Click on each paper's title to view its ADS entry.

publications	36	(including 8 first-author)
citations	1228	(via NASA ADS)
<i>h</i> -index	20	(<i>h</i> publications with at least <i>h</i> citations)
<i>i</i> ₁₀ -index	27	(publications with ≥ 10 citations)

First and second-author publications (13)

- 2020 — [THOR 42: A touchstone ~24 Myr-old eclipsing binary spanning the fully convective boundary](#)
Murphy, S. J., Lawson, W. A., Onken, C. A., Yong, D., Da Costa, G. S., Zhou, G., Mamajek, E. E., Bell, C. P. M., Bessell, M. S. & Feinstein, A. D.
Monthly Notices of the Royal Astronomical Society, 2020, 491(4), 4902 [4 citations]
- 2018 — [WISE J080822.18-644357.3 - a 45 Myr-old accreting M dwarf hosting a primordial disc](#)
Murphy, S. J., Mamajek, E. E. & Bell, C. P. M.
Monthly Notices of the Royal Astronomical Society, 2018, 476, 3290 [26 citations]
- 2017 — [A stellar census of the nearby, young 32 Orionis group](#)
Bell, C. P. M., **Murphy, S. J.** & Mamajek, E. E.
Monthly Notices of the Royal Astronomical Society, 2017, 468, 1198 [18 citations]
- 2015 — [New members of the TW Hydrae Association and two accreting M-dwarfs in Scorpius-Centaurus](#)
Murphy, S. J., Lawson, W. A. & Bento, J.
Monthly Notices of the Royal Astronomical Society, 2015, 453, 2220 [18 citations]
- [New low-mass members of the Octans stellar association and an updated 30-40 Myr lithium age](#)
Murphy, S. J. & Lawson, W. A.
Monthly Notices of the Royal Astronomical Society, 2015, 447, 1267 [41 citations]
- 2014 — [Evolution from protoplanetary to debris discs: the transition disc around HD 166191](#)
Kennedy, G. M., **Murphy, S. J.**, Lisse, C. M., Ménard, F., Sitko, M. L., Wyatt, M. C., Bayliss, D. D. R., DeMeo, F. E., Crawford, K. B., Kim, D. L., Rudy, R. J., Russell, R. W., Sibthorpe, B., Skinner, M. A. et al.
Monthly Notices of the Royal Astronomical Society, 2014, 438, 3299 [13 citations]
- 2013 — [Re-examining the membership and origin of the \$\epsilon\$ Cha association](#)
Murphy, S. J., Lawson, W. A. & Bessell, M. S.
Monthly Notices of the Royal Astronomical Society, 2013, 435, 1325 [61 citations]
- 2012 — [Spectrophotometric Libraries, Revised Photonic Passbands, and Zero Points for UBVRI, Hipparcos, and Tycho Photometry](#)
Bessell, M. & **Murphy, S.**
Publications of the Astronomical Society of the Pacific, 2012, 124, 140 [128 citations]
- [RX J0942.7-7726AB: an isolated pre-main-sequence wide binary](#)
Murphy, S. J., Lawson, W. A. & Bessell, M. S.
Monthly Notices of the Royal Astronomical Society, 2012, 424, 625 [3 citations]
- 2011 — [The Solar Neighborhood. XXVI. AP Col: The Closest \(8.4 pc\) Pre-main-sequence Star](#)
Riedel, A. R., **Murphy, S. J.**, Henry, T. J., Melis, C., Jao, W.-C. & Subasavage, J. P.
Astronomical Journal, 2011, 142, 104 [51 citations]
- [Episodic disc accretion in the halo of the 'old' pre-main-sequence cluster \$\eta\$ Chamaeleontis](#)
Murphy, S. J., Lawson, W. A., Bessell, M. S. & Bayliss, D. D. R.
Monthly Notices of the Royal Astronomical Society, 2011, 411, L51 [21 citations]

- 2010 — [First detection of a low-mass stellar halo around the young open cluster \$\eta\$ Chamaeleontis](#)
Murphy, S. J., Lawson, W. A. & Bessell, M. S.
 Monthly Notices of the Royal Astronomical Society, 2010, 406, L50 [29 citations]
- 2008 — [Revealing Substructure in the Galactic Halo: The SEKBO RR Lyrae Survey](#)
 Keller, S. C., **Murphy, S.**, Prior, S., Da Costa, G. & Schmidt, B.
 Astrophysical Journal, 2008, 678, 851 [77 citations]

Publications under review (1)

- 2021 — [Low-mass members of nearby young stellar moving groups from Gaia EDR3](#)
 Lee, J., Song, I. & **Murphy, S.**
 Submitted to Monthly Notices of the Royal Astronomical Society (June 26, MN-21-1295-MJ), 2021

Other refereed publications (23)

- 2021 — [High resolution spectroscopic follow-up of the most metal-poor candidates from SkyMapper DR1.1](#)
 Yong, D., Da Costa, G. S., Bessell, M. S., Chiti, A., Frebel, A., Gao, X., Lind, K., Mackey, A. D., Marino, A. F., **Murphy, S. J.**, Nordlander, T., Asplund, M., Casey, A. R., Kobayashi, C., Norris, J. E. et al.
 Accepted for publication in Monthly Notices of the Royal Astronomical Society (July 12), 2021
- [r-Process elements from magnetorotational hypernovae](#)
 Yong, D., Kobayashi, C., Da Costa, G. S., Bessell, M. S., Chiti, A., Frebel, A., Lind, K., Mackey, A. D., Nordlander, T., Asplund, M., Casey, A. R., Marino, A. F., **Murphy, S. J.** & Schmidt, B. P.
 Nature, 2021, 595, 223 [1 citation]
- [Exploring the Galaxy's halo and very metal-weak thick disc with SkyMapper and Gaia DR2](#)
 Cordoni, G., Da Costa, G. S., Yong, D., Mackey, A. D., Marino, A. F., Monty, S., Nordlander, T., Norris, J. E., Asplund, M., Bessell, M. S., Casey, A. R., Frebel, A., Lind, K., **Murphy, S. J.**, Schmidt, B. P. et al.
 Monthly Notices of the Royal Astronomical Society, 2021, 503(2), 2539 [10 citations]
- 2020 — [Sporadic and intense accretion in a 1 Myr-old brown dwarf candidate](#)
 Nguyen-Thanh, D., Phan-Bao, N., **Murphy, S. J.** & Bessell, M. S.
 Astronomy & Astrophysics, 2020, 634, A128 [3 citations]
- [2MASS J15460752-6258042: a mid-M dwarf hosting a prolonged accretion disc](#)
 Lee, J., Song, I. & **Murphy, S.**
 Monthly Notices of the Royal Astronomical Society, 2020, 494(1), 62 [8 citations]
- [The closest extremely low-mass white dwarf to the Sun](#)
 Kawka, A., Simpson, J. D., Vennes, S., Bessell, M. S., Da Costa, G. S., Marino, A. F. & **Murphy, S. J.**
 Monthly Notices of the Royal Astronomical Society, 2020, 495(1), L129 [6 citations]
- [A kinematically unbiased, all-sky search for nearby, young, low-mass stars](#)
 Binks, A. S., Chalifour, M., Kastner, J. H., Rodriguez, D., **Murphy, S. J.**, Principe, D. A., Punzi, K., Sacco, G. G. & Hernández, J.
 Monthly Notices of the Royal Astronomical Society, 2020, 491(1), 215 [4 citations]
- 2019 — [The lowest detected stellar Fe abundance: the halo star SMSS J160540.18-144323.1](#)
 Nordlander, T., Bessell, M. S., Da Costa, G. S., Mackey, A. D., Asplund, M., Casey, A. R., Chiti, A., Ezzeddine, R., Frebel, A., Lind, K., Marino, A. F., **Murphy, S. J.**, Norris, J. E., Schmidt, B. P. & Yong, D.
 Monthly Notices of the Royal Astronomical Society, 2019, 488(1), L109 [27 citations]
- [Keck HIRES spectroscopy of SkyMapper commissioning survey candidate extremely metal-poor stars](#)
 Marino, A. F., Da Costa, G. S., Casey, A. R., Asplund, M., Bessell, M. S., Frebel, A., Keller, S. C., Lind, K., Mackey, A. D., **Murphy, S. J.**, Nordlander, T., Norris, J. E., Schmidt, B. P. & Yong, D.
 Monthly Notices of the Royal Astronomical Society, 2019, 485(4), 5153 [8 citations]
- [Detection of a giant flare displaying quasi-periodic pulsations from a pre-main-sequence M star by the Next Generation Transit Survey](#)
 Jackman, J. A. G., Wheatley, P. J., Pugh, C. E., Kolotkov, D. Y., Broomhall, A.-M., Kennedy, G. M., **Murphy, S. J.**, Raddi, R., Burleigh, M. R., Casewell, S. L., Eig Müller, P., Gillen, E., Günther, M. N. et al.
 Monthly Notices of the Royal Astronomical Society, 2019, 482(4), 5553 [16 citations]

- [The Planet Formation Potential around a 45 Myr Old Accreting M Dwarf](#)
Flaherty, K., Hughes, A. M., Mamajek, E. E. & **Murphy, S. J.**
Astrophysical Journal, 2019, 872(1), 92 [10 citations]
- [The SkyMapper DR1.1 search for extremely metal-poor stars](#)
Da Costa, G. S., Bessell, M. S., Mackey, A. D., Nordlander, T., Asplund, M., Casey, A. R., Frebel, A., Lind, K., Marino, A. F., **Murphy, S. J.**, Norris, J. E., Schmidt, B. P. & Yong, D.
Monthly Notices of the Royal Astronomical Society, 2019, 489(4), 5900 [24 citations]
- 2018 — [SkyMapper Southern Survey: First Data Release \(DR1\)](#)
Wolf, C., Onken, C. A., Luvaul, L. C., Schmidt, B. P., Bessell, M. S., Chang, S.-W., Da Costa, G. S., Mackey, D., Martin-Jones, T., **Murphy, S. J.**, Preston, T., Scalzo, R. A., Shao, L., Smillie, J., Tisserand, P. et al.
Publications of the Astronomical Society of Australia, 2018, 35, e010 [203 citations]
- 2016 — [A nearby young M dwarf with a wide, possibly planetary-mass companion](#)
Deacon, N. R., Schlieder, J. E. & **Murphy, S. J.**
Monthly Notices of the Royal Astronomical Society, 2016, 457, 3191 [22 citations]
- [The ANU WiFeS SuperNova Programme \(AWSNAP\)](#)
Childress, M. J., Tucker, B. E., Yuan, F., Scalzo, R., Ruiter, A., Seitzzahl, I., Zhang, B., Schmidt, B., Anguiano, B., Aniyani, S., Bayliss, D. D. R., Bento, J., Bessell, M., Bian, F., Davies, R., Dopita, M., Fogarty, L., Fraser-McKelvie, A., Freeman, K., Kuruwita, R., Medling, A. M., **Murphy, S. J.** et al.
Publications of the Astronomical Society of Australia, 2016, 33, e055 [28 citations]
- 2015 — [A 0.24+0.18 M_⊙ double-lined eclipsing binary from the HATSouth survey](#)
Zhou, G., Bayliss, D., Hartman, J. D., Rabus, M., Bakos, G. Á., Jordán, A., Brahm, R., Penev, K., Csbry, Z., Mancini, L., Espinoza, N., de Val-Borro, M., Bhatti, W., Ciceri, S., Henning, T., Schmidt, B., **Murphy, S. J.**, Butler, R. P., Arriagada, P., Shectman, S., Crane, J., Thompson, I., Suc, V. & Noyes, R. W.
Monthly Notices of the Royal Astronomical Society, 2015, 451, 2263 [25 citations]
- 2013 — [Copious Amounts of Hot and Cold Dust Orbiting the Main Sequence A-type Stars HD 131488 and HD 121191](#)
Melis, C., Zuckerman, B., Rhee, J. H., Song, I., **Murphy, S. J.** & Bessell, M. S.
Astrophysical Journal, 2013, 778, 12 [25 citations]
- [The GALEX Nearby Young-Star Survey](#)
Rodriguez, D. R., Zuckerman, B., Kastner, J. H., Bessell, M. S., Faherty, J. K. & **Murphy, S. J.**
Astrophysical Journal, 2013, 774, 101 [89 citations]
- [A High-resolution Spectroscopic Search for the Remaining Donor for Tycho's Supernova](#)
Kerzendorf, W. E., Yong, D., Schmidt, B. P., Simon, J. D., Jeffery, C. S., Anderson, J., Podsiadlowski, P., Gal-Yam, A., Silverman, J. M., Filippenko, A. V., Nomoto, K., **Murphy, S. J.**, Bessell, M. S. et al.
Astrophysical Journal, 2013, 774, 99 [59 citations]
- [The Most Metal-poor Stars. I. Discovery, Data, and Atmospheric Parameters](#)
Norris, J. E., Bessell, M. S., Yong, D., Christlieb, N., Barklem, P. S., Asplund, M., **Murphy, S. J.**, Beers, T. C., Frebel, A. & Ryan, S. G.
Astrophysical Journal, 2013, 762, 25 [55 citations]
- 2012 — [Rapid disappearance of a warm, dusty circumstellar disk](#)
Melis, C., Zuckerman, B., Rhee, J. H., Song, I., **Murphy, S. J.** & Bessell, M. S.
Nature, 2012, 487, 74 [59 citations]
- [2M1155-79 \(= T Chamaeleontis B\): A Low-mass, Wide-separation Companion to the nearby, "Old" T Tauri Star T Chamaeleontis](#)
Kastner, J. H., Thompson, E. A., Montez, R., **Murphy, S. J.**, Bessell, M. S. & Sacco, G.
Astrophysical Journal, Letters, 2012, 747, L23 [17 citations]
- 2009 — [Extending the Virgo Stellar Stream with SEKBO Survey RR Lyrae Stars](#)
Prior, S. L., Da Costa, G. S., Keller, S. C. & **Murphy, S. J.**
Astrophysical Journal, 2009, 691, 306 [39 citations]