

Simon J. Murphy

ANU SkyMapper Postdoctoral Fellow

Current Position

Feb. 2015– **SkyMapper Postdoctoral Fellow**, Australian National University

Within the *SkyMapper* team I lead development of the *Virtual Observatory* web services which will allow Australian and international astronomers to easily access *SkyMapper* data products. My self-directed research focuses on characterising the youngest stars in the solar neighbourhood using a variety of photometric, astrometric and spectroscopic techniques.

Professional History

2013–2014 **Gliese Postdoctoral Fellow**, *Astronomisches Rechen-Institut*, University of Heidelberg

2012 **Postdoctoral Fellow**, *Research School of Astronomy & Astrophysics*, ANU

8–12/2009 **Research Assistant**, *RSAA*, ANU

2007–2011 **Ph.D. Student**, *RSAA*, ANU

Education

2007–2011 **Ph.D.**, *Australian National University*, Canberra (awarded July 13, 2012)

thesis title “*Revealing the Chamaeleon: Young, low-mass stars surrounding η and ϵ Chamaeleontis*”

supervisor Michael Bessell (ANU)

2006 **B.Sc. (First Class Honours)**, *Australian National University*, Canberra

thesis title “*A large-scale survey for RR Lyrae stars in the Galactic halo*”

2003–2005 **B.Sc. (Astronomy)**, *University of Canterbury*, Christchurch, New Zealand

Summary of Research Outputs

2008–present Refereed publications: **18**

First-author publications: **6** Second-author: **4**

Citations: **301**

Career Hirsch *h*-index: **11** Egghe *g*-index: **17**

Invited talks and tutorials: **12**

Research Interests

- Low-mass star formation and early stellar evolution
 - Age diagnostics
 - Accretion and circumstellar disc evolution
 - Wide binaries as probes of initial conditions
- Star clusters, moving groups and associations
 - New members (esp. at low and substellar masses)
 - Stellar kinematics, dynamical evolution of young groups
 - New statistical techniques
- e-Science; knowledge discovery from large data sets
- Scientific exploitation of the *Virtual Observatory*

Key Research Proficiencies

- Manipulation and development of large astronomical databases
- Analysis of stellar age diagnostics
- Extensive programming experience (Python–expert, Perl, some Java)
- Optical spectroscopy (low–high resolution)
- Integral-field spectroscopy and data reduction
- Optical wide-field imaging
- Astronomical data reduction packages (incl. IRAF, PyRAF, Figaro)
- Use and development of *Virtual Observatory* tools and web services
- Applications of stellar and Galactic kinematics

Awards and Prizes

- 2014–present Visiting Fellow, School of PEMS, University of New South Wales Canberra
- 2015 International Astronomical Union Travel Grant, IAUS 314 (€2,000)
- 2013–2014 Gliese Postdoctoral Fellowship, University of Heidelberg (€100,000)
- 2012 **Honourable Mention**, ASA Charlene Heisler Prize for best Australian astronomy thesis
- 2007–2011 Joan Duffield Research Scholarship, ANU (AUD\$15,000)
- 2007–2011 College of Science Distinguished Research Scholarship, ANU (AUD\$15,000)
- 2011 Alex Rodgers Travelling Scholarship, ANU (AUD\$3,000)
- 2011 Overseas Travel Grant, Astronomical Society of Australia (AUD\$1,000)
- 2011 **1st Prize**, Student Oral Presentation (runner-up 2009)
Astronomical Society of Australia Annual Scientific Meeting, Adelaide
- 2006 Bart J. Bok Honours Year Scholarship, ANU (AUD\$5,000)

Research Experience

Feb. 2015– **SkyMapper Postdoctoral Fellow**, *Australian National University*

Outside of my *Virtual Observatory* work I am a member of the *FunnelWeb* project, which is undertaking a spectroscopic survey of the brightest 2 million stars in the southern sky. I am also working with astronomers at the University of Georgia to better characterise several hundred southern debris disc host stars. My own research with *SkyMapper* focuses on the absolute calibration of its photometry as well as optimising samples of young and other interesting stars from its billion-row database. I also lead a survey of circumstellar accretion variability in star-forming regions using new H α photometry (Supervisor: Gary Da Costa).

2013–2014 **Gliese Postdoctoral Fellow**, *University of Heidelberg*

I developed innovative methods for the identification of young moving group members from large astronomical databases, including those to be produced by the *Gaia* astrometric satellite. They will be tested on the first *Gaia* data release in mid-2016. I applied these techniques to a large ongoing survey for new members of the Scorpius–Centaurus OB association, the closest site of recent massive star formation. While in Heidelberg I also formed an ongoing collaboration with MPIA (now Hertfordshire/NASA Ames) astronomers to confirm wide companions to young southern stars (Supervisor: Joachim Wambsganß).

2012 **Postdoctoral Fellow**, *Australian National University*

I was a member of the scientific commissioning team for *SkyMapper* and its *Southern Sky Survey*. My primary role was to commission the ‘quick-look’ software used by the telescope to autonomously monitor observations. I was also heavily involved in the national planning and application of *Virtual Observatory* standards to *SkyMapper* data, and the establishment of an ANU 2.3-m telescope data archive (Supervisor: Brian Schmidt).

2007–2011 **Ph.D. Student**, *Australian National University*

Working with Mike Bessell (ANU) and Warrick Lawson (UNSW Canberra), I investigated several young moving groups around the Chamaeleon molecular clouds, gaining extensive optical spectroscopy experience (30+ nights) across all resolutions on the ANU 2.3-m telescope. Continuing collaborations with several international groups led to the exciting discoveries of the closest-known young star and the still-unexplained, rapid disappearance of a circumstellar disc around a nearby star (Melis et al. 2012, *Nature*, 487, 74).

8–12/2009 **Research Assistant**, *Australian National University, Canberra*

In support of the ARC Discovery Project ‘*Nucleosynthetic Signatures of the First Stars*’, I developed a parallelised, least-squares fitting code for estimating stellar parameters from low-resolution spectra and synthetic model grids. (Supervisor: Mike Bessell)

2006 **Honours Student**, *Australian National University, Canberra*

I used archival, multi-epoch photometry to survey the Galactic halo to 80 kpc for RR Lyrae variable stars as probes of halo density and substructure (Supervisor: Stefan Keller).

Professional Service

2015–present Technical Working Group member, *Australian All-Sky Virtual Observatory*

2006–present Member of the *Astronomical Society of Australia*

2011–2014 Domain Advisor, *Australian All-Sky Virtual Observatory*

2009–2012 Member of the RSAA Data Archive Advisory Committee

2010 Student Member, ANU 2.3-m telescope Time Allocation Committee

Community Engagement

2007–2012 Member, Mount Stromlo Outreach Group

Presentations and observing nights with school children and community groups

8/2012 Media training workshop for early-career researchers, ANU

media Various radio interviews, newspaper coverage

Press Release: “*A new(ish) star is born*”,

<http://phys.org/news/2011-08-newish-star-born.html>

Press Release: “*Milky Way seen to be Galactic cannibal*”,

<http://phys.org/news/2008-04-milky-galactic-cannibal.html>

<http://www.abc.net.au/worldtoday/content/2008/s2209779.htm>

Colloquia and Invited Talks

12/2014 “**New low-mass members of the Octans moving group**”

Astronomisches Rechen-Institut Colloquium, University of Heidelberg, Germany

4/2014 “**Adventures in young stellar associations**”

Astrophysics Group Colloquium, University of New South Wales, Sydney, Australia

4/2014 **Invited talk: “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

2/2013 “**Young star science with SkyMapper – the journey so far**”

Astronomisches Rechen-Institut Colloquium, University of Heidelberg, Germany

- 6/2012 **“SkyMapper and the Southern Sky Survey”**
Astronomy Group Colloquium, University of Canterbury, New Zealand
- 3/2012 **“Revealing the Chamaeleon: young, low-mass stars surrounding η and ϵ Cha”**
Astronomisches Rechen-Institut Colloquium, University of Heidelberg, Germany
Physics & Astronomy Colloquium, University of Canterbury, New Zealand
RSAA Colloquium, Australian National University, Canberra
- 2/2011 **Invited lecture: “Introduction to Virtual Observatory tools and services”**
Australian Astroinformatics School, University of Western Australia, Perth
- 9/2010 **“A low-mass stellar halo surrounding η Chamaeleontis”**
Astronomy Group Colloquium, University of California Los Angeles
- 4/2009 **Invited lecture: “Introduction to Virtual Observatory tools and services”**
Australian Astroinformatics School, University of Sydney

Selected Conferences and Workshops

- 5/2015 *IAU Symposium 314: Young stars and planets near the Sun*, Atlanta, USA
Talk: “New low-mass members of Scorpius-Centaurus”
- 10/2014 *Second Heidelberg-Grenoble Inter-Institute Workshop*, Castle Ringberg, Germany
Talk: “The low-mass membership of the Octans moving group”
- 10/2014 *Second Gaia Challenge Workshop - Stellar Parameters*, Heidelberg, Germany
- 6/2014 *18th Cambridge Workshop on Cool Stars, Stellar Systems and the Sun*, Flagstaff, USA
Poster: “The low-mass membership and age of the Octans association”
- 4/2014 *SkyMapper: Everything you need to know to use the terabytes*, Canberra, Australia
Talk: “Young star science with SkyMapper”
- 3/2014 *Gaia and the Unseen: The Brown Dwarf Question*, Torino, Italy
Talk: “The low-mass membership of the Octans association – a parable for Gaia”
- 7/2013 *Protostars & Planets VI*, Heidelberg, Germany
Poster: “A fresh look at the 3–5 Myr-old ϵ Cha association”
- 6/2012 *17th Cambridge Workshop on Cool Stars, Stellar Systems and the Sun*, Barcelona, Spain
Poster: “Probing low-mass star formation with wide binaries”
- 3/2012 *42nd Saas-Fee Course: Dynamics of Young Star Clusters & Associations*, Switzerland
- 7/2011 *Astronomical Society of Australia Annual Scientific Meeting*, Adelaide
Talk: “AP Col: the closest young star to the Sun”
- 5/2011 *GREAT Summer School on Astrostatistics and Data Mining*, La Palma, Spain
- 5/2011 *Stellar Clusters & Associations: An RIA Workshop on Gaia*, Granada, Spain
Talk: “Revealing the Chamaeleon: The ϵ and η Cha Associations”
- 12/2010 *International Virtual Observatory Alliance Interoperability Meeting*, Nara, Japan
- 8/2010 *16th Cambridge Workshop on Cool Stars, Stellar Systems and the Sun*, Seattle, USA
Poster: “A low-mass stellar halo around η Cha”
- 6/2010 *Astroinformatics 2010*, Pasadena, USA

Refereed Publications

I am an author or co-author of **18** published refereed articles, including **six** first-author and **four** second-author publications (Hirsch *h*-index: **11**, citations: **301**; via NASA ADS).

In Preparation

19. *Canopus as a wide triple system* (2015)
Mamajek, E. E., **Murphy, S. J.**, Lodieu, N., Dieterich, S. B., Bowler, B. P., Gauza, B., & Ruiz, M. T.
To be submitted to Monthly Notices of the Royal Astronomical Society.

Published Articles

18. *New members of the TW Hydrae Association and two accreting M-dwarfs in Sco-Cen* (2015)
Murphy, S. J., Lawson, W. A., & Bento, J.
Submitted to Monthly Notices of the Royal Astronomical Society.
17. *A $0.24+0.18 M_{\odot}$ double-lined eclipsing binary from the HATSouth survey* (2015)
Zhou, G., Bayliss, D., Hartman, J. D., Rabus, M., Bakos, G. Á., Jordán, A., Brahm, R., Penev, K., Csubry, Z., Mancini, L., Espinoza, N., de Val-Borro, M., Bhatti, W., Ciceri, S., Schmidt, B. P., **Murphy, S. J.**, et al.
Accepted for publication in Monthly Notices of the Royal Astronomical Society.
16. *New low-mass members of the Octans stellar association and an updated 30-40 Myr lithium age* (2015)
Murphy, S. J. & Lawson, W. A.
Monthly Notices of the Royal Astronomical Society, 447, 1267.
15. *Evolution from protoplanetary to debris discs: the transition disc around HD 166191* (2014)
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., et al.
Monthly Notices of the Royal Astronomical Society, 438, 3299.
14. *Copious amounts of hot and cold dust orbiting the main sequence A-type stars HD 131488 and HD 121191* (2013)
Melis, C., Zuckerman, B., Rhee, J. H., Song, I., **Murphy, S. J.**, & Bessell, M. S.
Astrophysical Journal, 778, 12.
13. *Re-examining the membership and origin of the ϵ Cha association* (2013)
Murphy, S. J., Lawson, W. A., & Bessell, M. S.
Monthly Notices of the Royal Astronomical Society, 435, 1325.
12. *The GALEX nearby young star survey* (2013)
Rodriguez, D. R., Zuckerman, B., Kastner, J. H., Bessell, M. S., Faherty, J. K., & **Murphy, S. J.**
Astrophysical Journal, 774, 101.
11. *A high-resolution spectroscopic search for the remaining donor for Tycho's Supernova* (2013)
Kerzendorf, W. E., Yong, D., Schmidt, B. P., Simon, J. D., Jeffery, C. S., Anderson, J., Podsiadlowski, P., Gal-Yam, A., Silverman, J., Filippenko, A., Nomoto, K., **Murphy, S. J.**, et al.
Astrophysical Journal, 774, 99.
10. *The most metal-poor stars. I. Discovery, data, and atmospheric parameters* (2013)
Norris, J. E., Bessell, M. S., Yong, D., Christlieb, N., Barklem, P. S., Asplund, M., **Murphy, S. J.**, et al.
Astrophysical Journal, 762, 25.
9. *Rapid disappearance of a warm, dusty circumstellar disk* (2012)
Melis, C., Zuckerman, B., Rhee, J. H., Song, I., **Murphy, S. J.**, & Bessell, M. S.
Nature, 487, 74.

8. *RX J0942.7-7726AB: an isolated pre-main-sequence wide binary* (2012)
Murphy, S. J., Lawson, W. A., & Bessell, M. S.
Monthly Notices of the Royal Astronomical Society, 424, 625.
7. *2M1155-79 (= T Chamaeleontis B): A low-mass, wide-separation companion to the nearby, "old" T Tauri star T Chamaeleontis* (2012)
Kastner, J. H., Thompson, E. A., Montez, R., **Murphy, S. J.**, Bessell, M. S., & Sacco, G.
Astrophysical Journal, Letters, 747, L23.
6. *Spectrophotometric libraries, revised photonic passbands, and zero points for UBVRI, Hipparcos, and Tycho photometry* (2012)
Bessell, M. & **Murphy, S. J.**
Publications of the Astronomical Society of the Pacific, 124, 140.
5. *The Solar Neighborhood. XXVI. AP Col: The closest (8.4 pc) pre-main sequence star* (2011)
Riedel, A. R., **Murphy, S. J.**, Henry, T. J., Melis, C., Jao, W.-C., & Subasavage, J. P.
Astronomical Journal, 142, 104.
4. *Episodic disc accretion in the halo of the 'old' pre-main-sequence cluster η Chamaeleontis* (2011)
Murphy, S. J., Lawson, W. A., Bessell, M. S., & Bayliss, D. D. R.
Monthly Notices of the Royal Astronomical Society, 411, L51.
3. *First detection of a low-mass stellar halo around the young open cluster η Chamaeleontis* (2010)
Murphy, S. J., Lawson, W. A., & Bessell, M. S.
Monthly Notices of the Royal Astronomical Society, 406, L50.
2. *Extending the Virgo Stellar Stream with SEKBO Survey RR Lyrae stars* (2009)
Prior, S. L., Da Costa, G. S., Keller, S. C., & **Murphy, S. J.**
Astrophysical Journal, 691, 306.
1. *Revealing substructure in the Galactic Halo: The SEKBO RR Lyrae survey* (2008)
Keller, S. C., **Murphy, S. J.**, Prior, S., DaCosta, G., & Schmidt, B.
Astrophysical Journal, 678, 851.