

# Dr Sven Buder

## Curriculum vitae

### Research Interests

- Galactic Archaeology in the Milky Way with large stellar spectroscopic surveys
- Milky Way population analysis in chemical, dynamical, and temporal space, focussing on the disk populations and the transition with the (accreted) halo
- Member of survey management and builder of the GALAH survey, lead of WG4: Analysis
- State-of-the-art analysis of stellar spectra with 1D/<3D> Non-LTE spectrum synthesis (mainly *Spectroscopy Made Easy*) & data-driven models (mainly *The Cannon* and *The Payne*)
- Member of ASTRO 3D & 4MOST; previous member of SDSS-IV / APOGEE-2 & *Gaia*-ESO

### Experience

Since 2019 **Research Fellow**, *Research School of Astronomy and Astrophysics (RSAA), The Australian National University (ANU), Canberra, Australia.*

2010–2013 **Student assistant**, *Deutscher Bundestag Berlin*,  
Parliamentary Bureau of Federal Minister Dr Thomas de Maizière (now a.D.),  
Preparation & attendance of appointments, drafts of speeches & letters.

### Supervision and Teaching

2020 **Primary Supervisor**, *Visiting PhD student Xu Zhang, ANU.*

2020 **Tutor ASTR2013 Fundamental of Astrophysics**, *ANU*, Tutorials, Marking, and Field Trip to Siding Spring Observatory.

2017 **Tutor Practical physics lab**, *Heidelberg University*, FP 30 CCD characterisation & photometric analyses of globular clusters.

2013 & 2014 **Tutor Practical physics lab & Introduction to Astronomy**, *University Jena*, Experimental statistics with radioactive sources and marking of exercises.

### Education

2015–2019 **Ph.D. studies**, Max-Planck-Institute for Astronomy & University of Heidelberg.  
[PhD Thesis](#): Spectroscopic Analysis & Chemodynamic Exploration of the Milky Way with Million-Star Surveys. Supervisors: Dr Karin Lind & Prof Dr Melissa Ness

2013–2015 **Master of Science in Physics**, Friedrich Schiller University Jena, Germany.

Fall 2014 **Erasmus exchange semester**, Uppsala University, Sweden.

2010–2013 **Bachelor of Science in Physics**, Friedrich Schiller University Jena, Germany.

2010 **Abitur**, Saxonian state gymnasium St. Afra Meißen (boarding school).

### Fellowships

2015–2019 Fellowship of the International Max Planck Research School for Astronomy and Cosmic Physics at the University of Heidelberg.

2007–2010 Fellowship of the Esther & Silvius Dornier-Foundation.

### Presentations

#### Invited talks and lectures

2019 The Legacy of the *Gaia*-ESO Survey, Firenze, Italy.

2019 The Milky Way 2019: LAMOST and Other Leading Surveys, Yichang, China.

2019 Lecture at International School of Space Science, L'Aquila, Italy.

Mount Stromlo Observatory – Cotter Road Canberra 2611 ACT Australia

☎ +61-(0)2612-59316 • 📧 svenbuder • ✉ sven.buder@anu.edu.au

🌐 svenbuder.github.io • 🌐 svenbuder • 🐦 astro\_sven

- 2019 Stars without Borders, Ljubljana, Slovenia.
- 2019 EWASS Special Session on Metal-poor stars in Milky Way surveys, Lyon, France.
- 2018 Machine learning in Astronomy and Medicine, Lund, Sweden.
- 2017 A Celebration of CEMP and Gala of GALAH, Melbourne, Australia.
- 2017 Southern Cross, Sydney, Australia.
- Selected contributed talks (of 9)
- 2018 The life and times of the Milky Way, Shanghai, China.
- 2017 IAUS 334: Rediscovering our Galaxy, Potsdam, Germany.
- 2017 JINA-CEE Forging Connections, East Lansing, USA.
- 2016 Galactic Archaeology and Stellar Physics, Canberra, Australia.

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## Skills

### Organisational

- Leadership** ASTRO 3D Deputy Node Leader for GALAH, GALAH WG4 Lead, GALAH SMG Meeting Convener, RSAA Colloquium Committee Chair.
- SOC** *EWASS 2019 Special Session: Science calibrations for future European stellar spectroscopic surveys*, Lyon 2019.
- LOC** *Chemical Evolution and Nucleosynthesis Across the Galaxy*, Heidelberg 2018, *The Metal-Poor Galaxy*, Ringberg Castle 2018, *Gaia Sprint*, Heidelberg 2017, *Spring conference of the German Physical Society*, Jena 2013.

### Observational

- 2017 **2dF-HERMES**, at *Siding Spring Observatory*, 3.9 m, 10 nights (as Co-I).
- 2016 **FEROS**, at *La Silla Observatory*, 2.2 m, 3 nights (as Co-I).
- 2013–2015 **AstraLux**, at *Calar Alto Observatory*, 2.2 m, 9 nights (as Co-I).
- 2013–2015 **FLECHAS, STK, CTK-II, RTK**, at *University Observatory Jena*, 0.2-0.9 m, more than 50 nights with spectroscopy, astrometry, & photometry (as PI & Co-I).

### Programming

Python (Jupyter), IDL, Mathematica, incl. CPU and GPU parallel computing on high-performance clusters, Spectroscopy: SME (incl. development), IRAF.

### Language

<b>German</b> Mother tongue	<b>Swedish</b> Good (B2)	<b>French</b> School level (A2)
<b>English</b> Fluent (C2)	<b>Norwegian</b> Good (B1)	<b>Latin</b> School level (A2)

### Qualifications

- 2009 Advanced emergency medical services, *Johanniter-Unfall-Hilfe e.V.*
- 2008 Moderator & mediator, *Peer Training Sachsen e.V.*

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## Community service

- Referee**, *A&A*, *ApJ*, *ApJS*.
- Since 2019 **RSAA colloquium committee**.
- Since 2019 **RSAA committee for International PhD Scholarship program**.
- 2017–2019 **Co-founder**, *Astronomy on Tap Heidelberg*.
- 2014 **Hiring committee member**, for professor of solid state theory (W3), Uni Jena.
- 2012–2015 **Student & tutorial councils**, Faculty of Physics & Astronomy, Uni Jena.

Canberra, August 20, 2020

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🌐 svenbuder.github.io • 🌐 svenbuder • 🐦 astro\_sven

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## Publications

(Co-)authored 48 publications (41 refereed), including 2 first-author papers with ORCID ID [0000-0002-4031-8553](https://orcid.org/0000-0002-4031-8553). In total, the refereed publications have attracted 752 citations leading to a H-index of 16 as tracked by [ADS](#).

### Publications in preparation

- 2020 **Buder, S.**, et al.: The GALAH+ Survey: Third Data Release, MNRAS, see [latest draft](#).
- 2020 **Buder, S.**, et al.: The GALAH Survey: Chemodynamic decomposition of the Galaxy, A&A, see [latest draft](#).

### Submitted publications

- 2020 Kos, J., Bland-Hawthorn, J. **Buder, S.**, Nordlander, T. et al.: The GALAH survey: Chemical homogeneity of the Orion complex" and it has been given the reference, MNRAS, submitted.
- 2020 Clarke, J. T., Clerté, M., Hinkel, N. R., Wittenmyer, R. A., **et al.**: The GALAH Survey: Using galactic archaeology to refine our knowledge of TESS target stars, MNRAS, submitted.
- 2020 Martell, S. L., Simpson, J. D., Balasubramaniam, A. G., **Buder, S.**, et al.: The GALAH survey: Lithium-rich giant stars require multiple formation channels, MNRAS, [arXiv:2006.02106](#).

### Selected peer-reviewed publications

- 2019 **Buder, S.**, Lind, K., Ness, M., Asplund, M., et al.: The GALAH survey: An abundance, age, and kinematic inventory of the solar neighbourhood made with TGAS, [A&A](#), *624*, 19.
- 2018 **Buder, S.**, Asplund, M., Duong, L. et al.: The GALAH Survey: Second Data Release, [MNRAS](#), *478*, 4513.
- 2020 Wheeler, A., Ness, M., **Buder, S.**, et al.: Abundances in the Milky Way across five nucleosynthetic channels from 4 million LAMOST stars, [ApJ](#), *accepted*.
- 2020 Gao, X., Lind, K., Amarsi, M. A., **Buder, S.**, et al.: The GALAH Survey: A new constraint on cosmological lithium and Galactic lithium evolution from warm dwarf stars, [MNRAS](#), *497*, 30.
- 2020 Xiang, M.-S., Rix, H.-W. , Ting, Y.-S., Ludwig, H.-G., **et al.**: Chemically peculiar A and F stars with enhanced s-process and iron-peak elements: stellar radiative acceleration at work, [ApJ](#), *accepted*, [arXiv:2001.08227](#).
- 2020 Traven, G., Feltzing, S., Merle, T., Van der Swaelmen, M., **et al.**: The GALAH survey: Multiple stars and our Galaxy. I. A comprehensive method for deriving properties of FGK binary stars, A&A, *accepted*, [arXiv:2005.00014](#).
- 2020 Hayden, M., Bland-Hawthorn, J., Sharma, S., **et al.**: The GALAH Survey: Chemodynamics of the Solar Neighbourhood, [MNRAS](#), *493*, 2952.
- 2020 Lin, J., Asplund, M., Ting, Y.-S., Casagrande, L., **et al.**: The GALAH Survey: Temporal Chemical Enrichment of the Galactic Disk, [MNRAS](#), *491*, 2043.
- 2019 Kos, J., Bland-Hawthorn, J., Asplund, M., **Buder, S.**, et al.: Discovery of a 21 Myr old stellar population in the Orion complex, [A&A](#), *631*, 166.
- 2019 Casey, A. R., Lattanzio, J. C., Aletti, A., Dowe, D. L., **et al.**: A Data-driven Model of Nucleosynthesis with Chemical Tagging in a Lower-dimensional Latent Space, [ApJ](#), *887*, 73.

- 2019 Xiang, M., Ting, Y.-S., Rix, H.-W., **et al.**: Abundance Estimates for 16 Elements in 6 Million Stars from LAMOST DR5 Low-Resolution Spectra, *ApJ*, accepted, [ApJS, 245, 34](#).
- 2019 Sharma, S., Stello, D., Bland-Hawthorn, J., Hayden, M.R., **et al.**: The K2-HERMES Survey: age and metallicity of the thick disc, [MNRAS, 490, 5335](#).
- 2019 Bland-Hawthorn, J., Sharma, S., Tepper-Garcia, T., **et al.**: The GALAH survey and Gaia DR2: dissecting the stellar disc's phase space by age, action, chemistry and location, *MNRAS*, [MNRAS, 486, 1167](#).
- 2018 Gao, X., Lind, K., Amarsi, A. M., **Buder, S.**, et al.: The GALAH Survey: Verifying abundance trends in the open cluster M67 using non-LTE spectroscopy, [MNRAS, 481, 2666](#).
- 2018 Zwitter, T., Kos, J., Chiavassa, A., **Buder, S.**, et al.: The GALAH Survey: Accurate Radial Velocities and Library of Observed Stellar Template Spectra, [MNRAS, 481, 645](#).
- 2018 Kos, J., Bland-Hawthorn, J. Betters, C. H., **et al.**: Holistic spectroscopy: Complete reconstruction of a wide-field, multi-object spectroscopic image using a photonic comb, [MNRAS, 480, 5475](#).
- 2018 Kos, J., de Silva, G., **Buder, S.**, et al.: The GALAH Survey and *Gaia* DR2: (Non)existence of five sparse high-latitude open clusters, *MNRAS*, accepted, [MNRAS, 480, 5242](#).
- 2018 Quillen, A. C., De Silva, G. M., Sharma, S., **et al.**: The GALAH Survey: Stellar streams and how stellar velocity distributions vary with Galactic longitude, hemisphere and metallicity, [MNRAS, 478, 228](#).
- 2018 Duong, L., Freeman, K. C., Asplund, M., **et al.**: The GALAH survey: properties of the Galactic disk(s) in the solar neighbourhood, [MNRAS, 476, 5216](#).
- 2018 Kos, J., Bland-Hawthorn, J., Freeman, K., **Buder, S.**, et al.: The GALAH Survey: Chemical Tagging of Star Clusters and New Members in the Pleiades, [MNRAS, 473, 4612](#).
- 2018 Wittenmyer, R. A., Sharma, S., Stello, D., **Buder, S.**, et al.: The K2-HERMES Survey. I. Planet Candidate Properties from K2 Campaigns 1-3, [AJ, 155, 84](#).
- 2018 Sharma, S., Stello, D., **Buder, S.**, et al.: The TESS-HERMES survey Data Release 1: high-resolution spectroscopy of the TESS southern continuous viewing zone, [MNRAS, 473, 2004](#).
- 2017 Przybilla, N., Aschenbrenner, P., **Buder, S.**: Candidate exoplanet host HD131399A: a nascent Am star, [A&A, 604, 9](#).
- 2017 Jofré, P., Heiter, U., Worley, C. C.; **et al.**: *Gaia* FGK Benchmark stars: Opening the black box of stellar element abundance determination, [A&A, 601, 38](#).
- 2017 Martell, S. L., Sharma, S., **Buder, S.**, et al.: The GALAH survey: observational overview and *Gaia* DR1 companion, [MNRAS, 465, 3203](#).
- 2017 Mugrauer, M., **Buder, S.**, Reum, F., Birth, A.: The Großschwabhausen binary survey, [AN, 338, 61](#).
- 2016 Ginski, C., Mugrauer, M., Seeliger, M., **Buder, S.**, et al.: A lucky imaging multiplicity study of exoplanet host stars - II, [MNRAS, 457, 2173](#).
- 2016 Schmidt, T. O. B., Neuhäuser, R., Briceño, C, **et al.**: Direct Imaging discovery of a second planet candidate around the possibly transiting planet host CVSO 30, [A&A, 593, 75](#).

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## References

**PhD Supervisor,**

*Dr Karin Lind*, Stockholm University, [karin.lind@astro.su.se](mailto:karin.lind@astro.su.se).

**PhD Supervisor,**

*Prof Dr Melissa Ness*,

Columbia University & Center for Computational Astrophysics, Flatiron Institute  
New York City, [melissa.ness@columbia.edu](mailto:melissa.ness@columbia.edu).

**Initiator of GALAH survey,**

*Prof Dr Kenneth Freeman*, The Australian National University Canberra,  
[kenneth.freeman@anu.edu.au](mailto:kenneth.freeman@anu.edu.au).

**Initiator of GALAH survey,**

*Prof Dr Joss Bland-Hawthorn*, University of Sydney, [jbh@physics.usyd.edu.au](mailto:jbh@physics.usyd.edu.au).

**Director of former institute department,**

*Prof Dr Hans-Walter Rix*, MPA Heidelberg, [rix@mpia.de](mailto:rix@mpia.de).