ZIXIAN WANG (PURMORTAL, 王梓先)

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Department of Physics and Astronomy, University of Utah
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EDUCATION

Ph.D., Astronomy and Astrophysics *2019 - 2023*
The University of Sydney (USYD), Sydney, Australia
Thesis: *A Study of Galactic and Extragalactic Evolution with the MUSE Integral-Field Spectrograph*
Supervisor: Joss Bland-Hawthorn, Michael Hayden & Sanjib Sharma

B.Sc., Astronomy and Astrophysics *2015 - 2019*
Nanjing University (NJU), Nanjing, China
Thesis: *Comparison of Planetary Properties in Single-Star and Multiple-Star Systems*
Supervisor: Jiwei Xie

PROFESSIONAL EMPLOYMENTS

Postdoctoral Research Associate *Nov 2023 - present*
Department of Physics & Astronomy, University of Utah
Advisor: Anil Seth

Research Associate (Internship) *Aug 2023 - Oct 2023*
Astronomy Data and Compute Services (ADACS), Swinburne University of Technology
Supervisor: Jarrod Hurley

PUBLICATION SUMMARY

16 papers, including **5** first-author papers.
One first-author paper is currently under review at *Nature Astronomy*.

Metrics: h-index = **9** | Total Citations: **330**
Focus: Machine Learning, Galactic Archaeology, Globular Clusters, and Extragalactic Archaeology.

Full publication list available via NASA ADS, ORCID: 0000-0003-2512-6892.

OBSERVATIONAL TELESCOPE TIME

Survey / service observing
GALAH survey (AAT/HERMES) – survey observation, ∼ 200 hr; $200,000 AUD, 2020–2023

Principal Investigator
VLT/MUSE – "The View from Baade's Window: The Star Formation History and Chemo-dynamics of the Inner Galaxy", 9.8 hr, $150,000 AUD

Co-Investigator
JWST – "Astrometric monitoring of the fast stars around the intermediate-mass black hole in Omega Centauri", 2.6 hr
VLT/FLAMES – "Deciphering Omega Centauri's Formation History by Connecting Stellar Ages and Abundances", 2 nights, $300,000 AUD
ALMA – "The Hunt for Omega Cen*", 13.2 hr
VLT/MUSE – "GECKOS: Turning galaxy evolution on its side with deep observations of edge-on galaxies", 317 hr, $4,800,000 AUD

SUPERVISION AND TEACHING

Student Supervision

Callie Clontz (Ph.D., University of Utah), research mentor, 2 papers+1 in prep. *Nov 2023 – present*
Selin (Lily) Erickson (Undergraduate, University of Oklahoma), 1 paper in prep. *Jan 2025 – present*

Teaching

ASTR 6570-001 (Guest Lecturer), Utah *Spring 2024*
BUSS6002: Data Science in Business (tutor), Sydney *Aug 2022 - Jun 2023*
OLET1640: Astronomy: from Big Bang to Darkness (tutor), Sydney *Feb - Jun 2022*
OLET1638: Astronomy: from Stars to Black Holes (tutor), Sydney *Feb - Jun 2022*
OLET1636: Astronomy: from Earth to Exoplanets (tutor), Sydney *Feb - Jun 2022*
OLES1602: The Apocalypse in Science and Culture (tutor), Sydney *Aug - Dec 2021*
1st year physics (tutorial and lab demonstration), Sydney *Feb 2021 - Jun 2023*
2nd year physics (lab demonstration), Sydney *Feb 2020 - Dec 2022*

SOFTWARE

Click here to check my GitHub website

GalCraft

Sole Developer. A Python module to generate mock integral-field spectrograph observation of the Milky Way using stellar catalogs. See details on the project website.

mapviewer-web

Sole Developer. A web version of Mapviewer to illustrate galaxy properties obtained from the GIST pipeline. It is developed using DashPlotly. See details on the project website.

nGIST

Contributor. An updated version of GIST for the gist-geckos Pipeline to analyze MUSE data from the GECKOS survey. See details on the project website.

MCFOST

Contributor. A 3D continuum and line radiative transfer code based on a hybrid Monte Carlo and ray-tracing method. See details on the project website.

ACADEMIC PRESENTATIONS

Seminars/Colloquiums

Invited, University of New South Wales, Sydney, Australia *2025*
Invited, Max-Planck-Institut für Astronomie (MPIA), Heidelberg, Germany *2025*
Invited, Georg-August-Universität Göttingen, Göttingen, Germany *2025*
Invited, Liverpool John Moores University, Liverpool, UK *2024*
ASA ECR Symposium, University of New South Wales, Australia (virtual) *2023*
PhD Graduation Seminar, Shanghai Astronomical Observatory, Shanghai, China *2023*
PhD Graduation Seminar, University of Chinese Academy of Sciences, Hefei, China *2023*
PhD Graduation Seminar, Nanjing University, Nanjing, China *2023*
PhD Graduation Seminar, Beijing Normal University, Beijing, China *2023*
PhD Graduation Seminar, National Astronomical Observatories, Beijing, China *2023*
PhD Graduation Seminar, Yunnan University, Kunming, China *2023*
PhD Graduation Seminar, Space Telescope Science Institute, Baltimore, USA *2023*
PhD Graduation Seminar, University of Utah, Salt Lake City, USA *2023*

Conference Talks

Invited, "GECKOS-Oxford Science Workshop", Oxford, UK *2024*
Contributed, "Wide-Field Spectroscopy vs Galaxy Formation Theory", Tuscon, AZ, USA *2023*

Contributed, "DYNAMITE workshop", virtual *2022*
Contributed, "Linking the Galactic and Extra-galactic", Wollongong, Australia *2022*
Contributed, "ACAMAR 8 workshop", virtual *2022*
Contributed, "ACAMAR 7 workshop", virtual *2021*
Recorded, "Spatially Resolved Spectroscopy with Extremely Large Telescopes", virtual *2021*
Contributed, "ASTRO-3D Virtual Science Meeting", virtual *2021*
Recorded, "MAVIS workshop", virtual *2021*
Contributed, "Stromlo Student Seminars", virtual *2020*
Contributed, "1st Australian BlueMUSE Science Workshop", virtual *2020*

Conference Posters

"IAU 377, Ealy Disk-Galaxy Formation From JWST to the Milky Way", virtual *2023*
"2022 XXXIst General Assembly International Astronomical Union", Busan, Korea *2022*
"ASA Annual Science Meeting", Hobart, Australia *2022*
"ASA Annual Science Meeting", virtual *2021*
"European Astronomical Society Annual Meeting", virtual *2021*
"The University of Sydney HDR symposium", Sydney, Australia *2020*

MEDIA AND OUTREACH

Sydney observatory tour for Chinese new year @ Powerhouse Museum *2023*
Measuring reliable stellar abundances towards crowded regions using MUSE @ AAL *2022*
Explore the Double Asteroid Redirection Test (DART) mission (in Mandarin) @ SBS Podcast *2022*

ACADEMIC SERVICES

Evaluator, "Undergraduate Research Summer Symposium", UUtah *Summer 2024*
LoC, "Linking the Galactic and Extragalactic", Wollongong *Nov - Dec 2022*
Organizer, Milky Way / Extragalactic Journal Club, USYD *Jun 2021 - Feb 2023*
Seminar & Visitor host, SIfA seminar committee, USYD *Jan 2020 - Jun 2023*

AWARDS AND HONORS

ASA travel grant, $1,400 AUD *Sydney, 2022*
USYD HDR completion scholarship *Sydney, 2022*
ASTRO3D travel grant, $9,000 AUD *Sydney, 2020-2022*
Postgraduate Research Support Scheme (PRSS), $5,000 AUD *Sydney, 2020-2022*
2nd physics lab teaching award *Sydney, 2021*
ASTRO-3D postgraduate scholarship *Sydney, 2019*
USYD-CSC postgraduate scholarship *Sydney, 2019*
Chenxue Scholarship for overseas study *Nanjing, 2019*
Honor of outstanding undergraduate student *Nanjing, 2019*
Top-norch program scholarship *Nanjing, 2019*
National encouragement scholarship *Nanjing, 2018*
Top-norch program scholarship *Nanjing, 2015*

PUBLICATIONS

First-author & Significant Contributions

1. **Zixian Wang**, Anil C. Seth, Callie Clontz, Nadine Neumayer, Maximilian Häberle, et al., "oMEGACat. IX. Chemical Tagging of Omega Centauri Populations with Machine-Learning-Inferred Abundances from the MUSE Spectrograph", 2026, arXiv, arXiv:2603.01041 *(submitted to ApJ)* [NASA ADS]

2. **Zixian Wang**, Michael R. Hayden, Sanjib Sharma, Joss Bland-Hawthorn, Anil C. Seth, Gail Zasowski, "Age, Chemistry, and Kinematics of the Inner Galaxy Revealed by MUSE", 2025, arXiv, arXiv:2512.09527 *(Nature Astronomy under review)* [NASA ADS]

3. **Zixian Wang**, Anil C. Seth, Marilyn Latour, Jay Strader, Maximilian Häberle, et al., "oMEGACat. VII. Tracing Interstellar and Intracluster Medium of ω Centauri using Sodium Absorptions", 2025, ApJ, 994, 143 [NASA ADS]

4. **Zixian Wang**, Sanjib Sharma, Michael R. Hayden, Jesse van de Sande, Joss Bland-Hawthorn, Sam Vaughan, Marie Martig, et al., "Validating full-spectrum fitting with a synthetic integral-field spectroscopic observation of the Milky Way", 2024, MNRAS, 534, 1175 [NASA ADS]

5. **Zixian Wang**, Michael R. Hayden, Sanjib Sharma, Maosheng Xiang, Yuan-Sen Ting, Joss Bland-Hawthorn, Boquan Chen, "Reliable stellar abundances of individual stars with the MUSE integral-field spectrograph", 2022, MNRAS, 514, 1034 [NASA ADS]

6. Callie Clontz, Anil C. Seth, **Zixian Wang**, Maximilian Häberle, Maria Selina Nitschai, et al., "oMEGACat. VIII. A Subpopulation Census of ω Centauri", 2026, ApJ, 998, 177 [NASA ADS]

7. Callie Clontz, Anil C. Seth, **Zixian Wang**, Stefano O. Souza, Maximilian Häberle, et al., "oMEGACat. V. Helium Enrichment in ω Centauri as a Function of Metallicity", 2025, ApJ, 984, 162 [NASA ADS]

8. Randa Asa'd, Svea Hernandez, J. M. John, Mayte Alfaro-Cuello, **Zixian Wang**, A. As'ad, A. Vasini, Francesca Matteucci, "NGC 1856: Using Machine Learning Techniques to Uncover Detailed Stellar Abundances from MUSE Data", 2024, AJ, 167, 265 [NASA ADS]

Complete List of Remaining Publications

1. Benjamin J. Gibson, Gail Zasowski, Anil C. Seth, Dimitri A. Gadotti, **Zixian Wang**, et al., "Towards understanding the Milky Way's typicality: assessing the chemodynamics of M31's bulge and bar, thick and thin discs", 2025, MNRAS, 542, 669 [NASA ADS]

2. Amelia Fraser-McKelvie, Jesse van de Sande, Dimitri A. Gadotti, Eric Emsellem, Toby Brown, et al. (**including Zixian Wang**), "The GECKOS survey: Identifying kinematic sub-structures in edge-on galaxies", 2025, A&A, 700, A237 [NASA ADS]

3. Sven Buder, Janez Kos, Ella X. Wang, Madeleine McKenzie, Madeline Howell, et al. (**including Zixian Purmortal Wang**), "The GALAH survey: Data release 4", 2025, PASA, 42, e051 [NASA ADS]

4. Maximilian Häberle, Nadine Neumayer, Callie Clontz, Anil C. Seth, Peter J. Smith, et al. (**including Zixian Wang**), "oMEGACat. VI. Analysis of the Overall Kinematics of Omega Centauri in 3D: Velocity Dispersion, Kinematic Distance, Anisotropy, and Energy Equipartition", 2025, ApJ, 983, 95 [NASA ADS]

5. Callie Clontz, Anil C. Seth, Aaron Dotter, Maximilian Häberle, Maria Selina Nitschai, Nadine Neumayer, Anja Feldmeier-Krause, et al. (**including Zixian Wang**), "oMEGACat. IV. Constraining the Ages of Omega Centauri Subgiant Branch Stars with HST and MUSE", 2024, ApJ, 977, 14 [NASA ADS]

6. Maria Selina Nitschai, Nadine Neumayer, Maximilian Häberle, Callie Clontz, Anil C. Seth, et al. (**including Zixian Wang**), "oMEGACat. III. Multiband Photometry and Metallicities Reveal Spatially Well-mixed Populations within ω Centauri's Half-light Radius", 2024, ApJ, 970, 152 [NASA ADS]

7. Michael R. Hayden, Sanjib Sharma, Joss Bland-Hawthorn, Lorenzo Spina, Sven Buder, et al. (**including Purmortal Wang**), "The GALAH survey: chemical clocks", 2022, MNRAS, 517, 5325 [NASA ADS]

8. Sanjib Sharma, Michael R. Hayden, Joss Bland-Hawthorn, Dennis Stello, Sven Buder, et al. (**including Purmortal Wang**), "The GALAH Survey: dependence of elemental abundances on age and metallicity for stars in the Galactic disc", 2022, MNRAS, 510, 734 [NASA ADS]

REFERENCES

Prof. Anil Seth (Postdoc Advisor)
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Dr. Sanjib Sharma (Ph.D. Supervisor)
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