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Education and Employment

May 2021 – present	Assistant Professor , School of Astronomy and Space Science, Nanjing University, China
Mar 2021 – Apr 2024	Postdoc , Observatoire Astronomique de Strasbourg, CNRS, France
Dec 2017 – Aug 2020	LAMOST Fellow , Shanghai Astronomical Observatory, China
Oct 2015 – Oct 2017	Postdoc , Shanghai Jiao Tong University, China
Sep 2009 – Sep 2015	PhD , University of Minnesota, USA Supervisor: Professor Yong-Zhong Qian
Sep 2005 – Jun 2009	BS , Physics, Nanjing University, China

Research Interests

Galactic Archaeology

- Developing state-of-the-art algorithms to search for streams and substructures in the stellar halo of the Milky Way in the *Gaia* era, using those to understand nucleosynthesis in ancient dwarf galaxies
- Detecting and characterizing dwarf galaxies in the Local Group with the *Chinese Space Station Telescope*, using them to probe the faint end of galaxy formation in a cosmological context

Deep Learning in Astronomy

- Developing Machine Learning tools tailored to various astronomic datasets with the aim of fully extracting the information from the observations to achieve tractable improvements from traditional approach

Publications and Presentations

- 11 first/corresponding author publications (2016 – 2024), 337 citations
- China Top Cited Paper Award (2023), 68 citations
- China Top Cited Paper Award (2022), 117 citations
- 47 total publications including 1 Nature (2016 – 2024), 1200 citations, *h*-index 21
- 5 invited conference talks, 4 colloquium talks around the world

Machine Learning Applications in Astronomy

2022-2023	Developed PhotCalib, a neural-network based photometric survey calibrator and applied to the <i>Pristine</i> survey data Developing GNNPhot, a graph-neural-network based method to derive stellar parameters from multi-band photometry
2017 – 2020	Developed StarGO, a novel group identification method based on self-organizing-maps, applicable to general clustering problems Applied StarGO to the <i>Gaia</i> dataset, discovered the tidal tails of Coma Berenices open cluster Applied StarGO to the LAMOST- <i>Gaia</i> dataset, discovered a series of new very metal-poor substructures , and a new stellar stream , named LMS-1

Observations and Proposals

Observing experience: 11 nights in person (INT/IDS, VLT/UVES), 16 nights in remote mode on 2–8m telescopes (VLT/UVES, Subaru/HDS, Magellan/MIKE, ESO 2.2m/FEROS)

Successful proposals: 15 proposals as PI or significantly contributing co-I. The series of proposals on high-resolution follow-up of substructures, streams, eclipsing binaries, and etc:

- 100 hours with VLT/UVES (2020B, 2021B, 2023A, 2023B)
- 5.5 nights with Subaru/HDS (2019B, 2020B, 2021A, 2022B)
- 3 nights with Magellan/MIKE (2019B, 2022B)
- 30 hours with CFHT/ESPaDOnS (2020B, 2021A, 2023A)
- 10 nights with ESO 2.2m/FEROS (2024A)

Teamwork and Experience

Team leader

- **HR-GO team**, leading a high-resolution spectroscopic analysis core team of junior researchers around the world to systematically work on the spectra taken from different telescopes, since Apr 2021
- **Dwarf Galaxy Detection team**, leading a core team of 5 researchers and PhD students from different institutes to work on the project of dwarf galaxy detection with *CSST*, since 2020
- Astro Hack week team, Heidelberg, Oct 2022
- *Gaia*-LAMOST hackathon team, Shanghai, Nov 2018
- Visualization Environmental Data Challenge team, Sep 2016

Organisation

- SOC member of the Astronomy Big Data Exploration Camp, ABDEC, Kunming, Yunnan, China
(I) Stellar parameters, Jul 2023
(II) High-resolution spectroscopy, Jul 2024
- Co-organizer of Astro-Coffee, Strasbourg Observatory, Sep 2021 – Sep 2022
- Co-organizer of Machine Learning Club, Strasbourg Observatory, Oct 2021 – Mar 2022
- LOC member, Journées scientifiques "Galaxies" du PNCG, Strasbourg, France, Jun 2022
- LOC member, The Life and Times of the Milky Way, Shanghai, China, Nov 2018
- Co-organizer of Astro-NEWS, Shanghai Astronomical Observatory, 2018

Memberships

- Core member of the *Pristine*, since 2020
- Active member of WEAVE Galactic Archaeology High-Resolution sub-survey and Low-Resolution Highlat sub-survey, since 2021
- Member of the 4MOST – S1 – Milky Way Halo Low-Resolution sub-survey, since 2021

Teaching and Supervision

- Co-supervision of Han Qu, PhD student at Purple Mountain Observatory (Mar 2021 – present)
- Teaching assistant courses: Introductory Physics for non-physics majors, Introduction to Particle and Nuclear Physics, Quantum Mechanics for physics undergraduates and graduates (Sep 2009 – Dec 2011)

Outreach

- Press Release (*Chinese*): The stellar structure with the lowest metallicity of the Universe, Mar 2022
- Public Talk: Mining Astronomical Data in the Machine Learning Era, Fudan University, Shanghai, Nov 2018

Presentations and Hackathons

selected international conference, seminar, and colloquium talks from 2018 to the present

- 2024 | **Invited Seminar talk** – Observatoire de la Cote d’Azur, France, Sep 2024
Invited talk, "Chasing the stellar structure with the lowest metallicity of the Universe" – GalPhases24, Strasbourg, France, Aug 2024
Invited Seminar talk – GEPI, Observatoire de Paris, France, Mar 2024
- 2023 | **Invited talk**, "The C-19 Stream: the most meta-poor stellar structure" – The Sino-French Tianguan Meeting, Dunhuang, China, Oct 2023
Invited talk, "Tracing low-metallicity planar stars under a slowing down bar" – Revealed by Gaia: the central halo of the Milky Way, Cambridge, UK, Sep 2023
- 2022 | **Astro Hack Week**, Heidelberg, Germany, Oct 2022
Invited Physics colloquium talk – University of Groningen, Netherlands, Sep 2022
Contributed talk, "Very and extremely metal poor stellar streams - messengers from the early universe" – Satellite galaxies and tidal streams in the framework of cosmological models – EAS, Valencia, Spain, Jul 2022
Contributed talk – Journées scientifiques "Galaxies" du PNCG, Strasbourg, France, Jun 2022
Invited talk, "Very and extremely metal poor stellar streams - messengers from the early universe" – The Local Group in the Gaia era: from the Galactic halo to the Andromeda galaxy – Les Journées de la Société Française d’Astronomie & d’Astrophysique, Besançon, France, Jun 2022
- 2020 | **Invited colloquium talk**, Observatoire de Strasbourg, France, Jun 2020
Contributed talk, "Dynamical Relics of the Ancient Galactic Halo" – First Stars VI, Concepción, Chile, Mar 2020
- 2019 | **LAMOST-Gaia Sprint**, Yichang, China, Oct 2019
Contributed talk – The Milky Way 2019: LAMOST and Other Surveys, Yichang, China, Oct 2019
Contributed talk, "Dynamical Relics with r-process Enhanced Signatures from Ancient Small Dwarf Galaxies" – CEMP Stars as Probes of First-Star Nucleosynthesis, the IMF, and Galactic Assembly, Geneva, Switzerland, Sep 2019
Contributed talk, "Relics from LAMOST DR3 Very Metal-Poor Stars – Linking to Early Nucleosynthesis in Ancient Dwarf Galaxies" – The Gaia Treasure Hunt, Workshop at IoA, Cambridge, UK, Sep 2019
Seminar talk, "Dynamical Relics with r-process Enhanced Signatures from Ancient Small Dwarf Galaxies" – KITP Program: Dynamical Models for Stars and Gas in Galaxies in the Gaia Era. Santa Barbara, US, Apr 2019
Gaia Sprint, Santa Barbara, US, Mar 2019
- 2018 | **LAMOST-Gaia Hackathon**, Shanghai, China, Nov 2018
Contributed talk, "The Identification of the Northern Counterpart of the Cetus Polar Stream and Its Association with NGC 5824" – The Life and Times of the Milky Way, Shanghai, China, Nov 2018
LAMOST-Gaia Sprint, Beijing, China, Jun 2018

Publications list

22 major contribution papers from the full publication list (2016 - 2024)

- 2024 **Yuan, Z.** , Li, C., Martin, N. F. et al., 2023, "Could very low-metallicity stars with rotation-dominated orbits have been shepherded by the bar?", A&A, in press.
- Li, C., **Yuan, Z.** , Monari, G., et al., 2023, "Exploring the impact of a decelerating bar on transforming bulge orbits into disc-like orbits", A&A, 690, A26.
- Sitnova, T. M., **Yuan, Z.** , Matsuno, T., et al. 2024, "HR-GO I: Comprehensive NLTE abundance analysis of the Cetus stream", A&A, in press.
- Viswanathan, A., **Yuan, Z.** , Ardern-Arentsen, A., et al. 2024, "The Pristine survey - XXVI. The very metal-poor Galaxy: Chemodynamics through the follow-up of the Pristine-Gaia synthetic catalogue", arXiv:2405.13124.
- Sitnova, T. M., Matsuno, T., **Yuan, Z.** , et al. 2023, "The Pristine survey - XXII. A serendipitous discovery of an extremely Li-rich very metal-poor giant and a new method of ${}^6\text{Li}/{}^7\text{Li}$ isotope measurement", MNRAS, 526, 5976-5986.
- 2023 Martin, N. F., Starkenburg, E., **Yuan, Z.** , et al, 2023, "The Pristine survey - XXIII. Data Release 1 and an all-sky metallicity catalogue based on Gaia DR3 BP/RP spectro-photometry", arXiv:2308.01344.
- Qu, H., **Yuan, Z.** , Doliva-Dolinsky, A., et al. 2022 "Local Group dwarf galaxy detection limit in the Chinese Space Station Telescope Survey", MNRAS, 523, 876-886
- 2022 Martin, N. F., Ibata, R. A., Starkenburg, E., **Yuan, Z.** , et al. 2022 "The Pristine survey - XVI. The metallicity of 26 stellar streams around the Milky Way detected with the STREAMFINDER in Gaia EDR3," MNRAS, 516, 5331-5354
- Ramos, P., Antoja, T., **Yuan, Z.** , et al. 2022 "The Sagittarius stream in Gaia Early Data Release 3 and the origin of the bifurcations," A&A, 666, A64
- Yuan, Z.** , Martin, N. F., Ibata, R. A., et al. 2022 "The Pristine survey - XVII. The C-19 stream is dynamically hot and more extended than previously thought," MNRAS, 514, 1664-1671
- Yuan, Z.** , Malhan, K., Sestito, F., et al. 2022 "The Complexity of the Cetus Stream Unveiled from the Fusion of STREAMFINDER and StarGO," ApJ, 930, 103
- 2021 Malhan, K., **Yuan, Z.** , Ibata, R. A., et al. 2021 "Evidence of a Dwarf Galaxy Stream Populating the Inner Milky Way Halo," ApJ, 920, 51
- 2020 Chang, J., **Yuan, Z.** , Xue, X.-X., et al. 2020 "Is NGC 5824 the Core of the Progenitor of the Cetus Stream?," ApJ, 905, 100
- Banerjee, P., Wu, M.-R., **Yuan, Z.** , 2020 "Neutron Star Mergers as the Main Source of r-process: Natal Kicks and Inside-out Evolution to the Rescue," ApJL, 902, L34
- Placco, V. M., Santucci, R. M., **Yuan, Z.** , et al. 2020 "The R-process Alliance: The Peculiar Chemical Abundance Pattern of RAVE J183013.5-455510," ApJ, 897, 78
- Yuan, Z.** , Chang, J., Beers, T. C., et al. 2020 "A Low-mass Stellar-debris Stream Associated with a Globular Cluster Pair in the Halo," ApJL, 898, L37
- Yuan, Z.** , Myeong, G. C., Beers, T. C., et al. 2020 "Dynamical Relics of the Ancient Galactic Halo," ApJ, 891, 39

- 2019 | **Yuan, Z.** , Smith, M. C., Xue, X.-X., et al. 2019 "Revealing the Complicated Story of the Cetus Stream with StarGO," *ApJ*, 881, 164
- Tang, S.-Y., Pang, X., **Yuan, Z.** , et al. 2019 "Discovery of Tidal Tails in Disrupting Open Clusters: Coma Berenices and a Neighbor Stellar Group," *ApJ*, 877, 12
- 2018 | **Yuan, Z.** , Chang, J., Banerjee, P., et al. 2018 "StarGO: A New Method to Identify the Galactic Origins of Halo Stars," *ApJ*, 863, 26
- 2016 | **Yuan, Z.** , Qian, Y.-Z., Jing, Y. P. 2016 "Estimating the evolution of gas in the Fornax dwarf spheroidal galaxy from its star formation history: an illustrative example," *MNRAS*, 456, 3253-3264