

ZEKANG ZHANG

CONTACT

Address LMU Munich
University Observatory Munich
Chair for Astrophysics, Cosmology and Artificial Intelligence (ACAI)

Email zekang.zhang@physik.lmu.de

Web [personal webpage](#)
[github.com/zhangzzk](#)

RESEARCH INTERESTS

I work on observational cosmology, with a focus on photometric galaxy surveys: how galaxy images, colors, positions, redshift distributions, and sample selection become reliable measurements of cosmic structure through gravitational lensing and galaxy clustering.

My work combines image simulations, modeling survey systematics, photometric-redshift and shear estimation, and cosmological inference, using machine learning, analytical modeling, and statistics.

EDUCATION

<i>PhD in Astrophysics</i>	2023–2027 (expected)	Ludwig-Maximilians-Universität München University Observatory Munich, Germany Supervisor: Prof. Daniel Gruen.
<i>MSc in Astrophysics</i>	2020–2023	University of Chinese Academy of Sciences Beijing, China Thesis: “Probing the Dark Universe with Multi-Epoch Galaxies.” Supervisors: Prof. Huanyuan Shan and Prof. Jiajun Zhang.
<i>BSc in Physics</i>	2015–2019	Jilin University Jilin, China Thesis: “Research in the Evolution of Protoplanetary Disks.” Supervisor: Prof. Ning Yan.

PUBLICATIONS

<i>In prep.</i>	Practical Simulation-based Shear Inference: detection, selection and blending. Z. Zhang et al. Likelihood-based weak-lensing shear inference accounting for shear-dependent detection, selection, and blending.
<i>Submitted to A&A, 2026</i>	Anisotropic redshift distributions in photometric galaxy clustering and their cosmological impact. Z. Zhang , Y. Wang, D. Gruen, H. Kong, L. Tortorelli, S. Fischbacher, and Z. Yan.
<i>A&A, 2026</i>	Emulating redshift mixing due to blending in weak gravitational lensing. Z. Zhang , D. Gruen, L. Tortorelli, S.-S. Li, and J. McCullough. <i>A&A</i> , 706, A234. arXiv:2507.19130 .
<i>A&A, 2024</i>	FORKLENS: Accurate weak-lensing shear measurement with deep learning. Z. Zhang , H. Shan, N. Li, C. Wei, J. Yao, et al. <i>A&A</i> , 683, A209. arXiv:2301.02986 .
<i>AJ, 2024</i>	HybPSF: Hybrid PSF reconstruction for the observed JWST NIRCам image. L. Nie, H. Shan, G. Li, L. Wang, C. Tao, Q. Cui, Y. Xie, D. Liu, and Z. Zhang . <i>AJ</i> , 167, 58. arXiv:2308.14065 .

<i>MNRAS</i> , 2022	Impact of the turnover in the high- z galaxy luminosity function on the 21-cm signal during Cosmic Dawn and Epoch of Reionization. Z. Zhang , H. Shan, J. Gu, Q. Zheng, Y. Xu, B. Yue, Y. Liu, Z. Zhu, and Q. Guo. <i>MNRAS</i> , 516, 1573–1581. arXiv:2208.01492 .
<i>PIA</i> , 2021	Progress on the Exploration of the Cosmic Dawn and the Epoch of Reionization. B. Zhao, Q. Zheng, Z. Zhang , et al. <i>Progress in Astronomy</i> , 39(4). DOI .

SOFTWARE

SBSI	Simulation-Based Shear Inference Likelihood-based shear inference with conditional measurement flows and explicit detection, selection, and blending responses.
BlendEMU	Blending and selection emulator Image simulations and machine-learning models for blending and selection effects.
Skyvar	Spatially varying survey selection Forward modeling of spatially varying selection and redshift distributions for galaxy clustering.
FORKLENS	Deep-learning shear measurement Galaxy-shape measurement and weak-lensing shear calibration.

TEACHING

<i>Teaching Assistant</i>	2023–2026	Numerical Calculations , LMU Munich Supervised computational laboratory sessions for MSc students.
<i>Teaching Assistant</i>	2025	AI/Simulation-Based Inference Lab , LMU Munich Tutored MSc students in practical statistical and machine-learning inference exercises.
<i>Teaching Assistant</i>	2026	Introduction to Advanced Astrophysics LMU Munich Tutored MSc students in advanced astrophysics concepts and problem-solving.

REFeree

Astronomy & Astrophysics, Physical Review D

AWARDS

2023–2027	DAAD Doctoral Research Grant
2023	SHAO Outstanding MSc Candidate

REFERENCES

<i>PhD advisor</i>	Daniel Gruen University Observatory Munich, LMU Munich Daniel.Gruen@lmu.de
<i>MSc advisor</i>	Huanyuan Shan Shanghai Astronomical Observatory, Chinese Academy of Sciences hyshan@shao.ac.cn
	Luca Tortorelli University Observatory Munich, LMU Munich luca.tortorelli@physik.lmu.de