CHUN-HAO TO

CONTACT

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RESEARCH INTERESTS

Observational and Computational cosmology
Cluster cosmology, Weak gravitational lensing, Large-scale structure, Combined-probe analyses, Galaxy–halo connection

EMPLOYMENT

Schmidt AI Fellow, University of Chicago	*2024 – present*
CCAPP Postdoctoral Fellow, Ohio State University	*2021–2024*

EDUCATION

Ph.D in Physics	*2016–2021*
Department of Physics, Stanford University, CA, USA	
B.S. in Physics	*2011–2015*
Department of Physics, National Taiwan University, Taipei, Taiwan	

AWARDS

- Midway Research II allocation *2024*
  Awarded 2 million computing hours

- Dark Energy Survey builder status (for 2 FTE years of infrastructure work) *2020*

- Dark Energy Survey Early Career Scientist *2019*
  Awarded US$2500 for participating in 3 DES Collaboration Meetings

- Dean's Award of College of Science, National Taiwan University *2015*

SCIENCE LEADERSHIP

- Co-convenor of DES cluster working group (2024–)

- Analysis Co-lead of cluster cosmology key projects of DES (2021–2023)

SERVICE

- Reviewer of NASA Grant

- Referee of MNRAS and A&A, since 2021.

- Organizer of Cosmolunch at OSU, since 2021.

- Internal referee of DES, since 2020.

TEACHING AND OUTREACH

- Public talk at Bexley library:
  "Simulating the Universe with Supercomputers"   *Summer 2023*
  "Learning the dark universe with galaxies and galaxy clusters"   *Summer 2022*

- Guest lecturer at Astronomy 2895 Topics in Astrophysics   *Fall 2021*

- The Origin and Development of the Cosmos   *Winter 2020*

- Astronomy Laboratory and Observational Astronomy   *Fall 2018*

- Electricity and Magnetism Lab   *Spring 2017*

- Teacher, Stanford ESP Splash! Program   *Spring 2017*

MENTORING EXPERIENCE

- Kathlynn Simotas, undergrad student at Stanford (past), UCSB graduate student, Quantifying redMaPPer cluster systematics using galaxies with spectroscopic redshifts, 2019–2021

- Nihar Dalal, graduate student at Ohio State University, Cluster cosmology with ACT and DES, 2023–

- Gwen Sheley, undergrad student at UChicago, Quantify systematics in tSZ x shear, 2024–

PUBLICATIONS

135 refereed publications with a total of 6414 citations (6102 citations in refereed Journals), h-index=42 according to NASA/ADS Metrics Summary.

First author publications:

1. **To, C.-H.**, Pandey, S., Krause, E., Dalal, N., Anbajagane, D., & Weinberg, D. H. 2024, "Deciphering baryonic feedback with galaxy clusters", *Journal of Cosmology and Astroparticle Physics*, 2024, 037

2. **To, C.-H.**, DeRose, J., Wechsler, R. H., et al. 2024, "Buzzard to Cardinal: Improved Mock Catalogs for Large Galaxy Surveys", *The Astrophysical Journal*, 961, 59

3. **To, C.-H.**, Rozo, E., Krause, E., Wu, H.-Y., Wechsler, R. H., & Salcedo, A. N. 2023, "LINNA: Likelihood Inference Neural Network Accelerator", *Journal of Cosmology and Astroparticle Physics*, 2023, 016

4. **To, C.-H.**, Krause, E., Rozo, E., et al. 2021, "Dark Energy Survey Year 1 Results: Cosmological Constraints from Cluster Abundances, Weak Lensing, and Galaxy Correlations", *Physical Review Letters*, 126, 141301

5. **To, C.-H.**, Krause, E., Rozo, E., et al. 2021, "Combination of cluster number counts and two-point correlations: validation on mock Dark Energy Survey", *Monthly Notices of the Royal Astronomical Society*, 502, 4093

6. **To, C.-H.**, Reddick, R. M., Rozo, E., Rykoff, E., & Wechsler, R. H. 2020, "RedMaP-Per: Evolution and Mass Dependence of the Conditional Luminosity Functions of Red Galaxies in Galaxy Clusters", *The Astrophysical Journal*, 897, 15

7. **To, C.-H.**, Wang, W.-H., & Owen, F. N. 2014, "Star Formation Rate and Extinction in Faint z ~4 Lyman Break Galaxies", *The Astrophysical Journal*, 792, 139

PROGRAMMING SKILLS

Extensive experiences on Python, Pytorch, C/C++, and IDL

Public Software: `https://github.com/chto/linna`

Public Webpage: `https://chunhaoto.com/cardinalsim/`

PRESENTATIONS

* Invited Presentations

2023	• *Cosmology Astrophysics Seminar at University of Michigan	*Nov*
	• Plenary talk at Dark Energy Survey Collaboration Meeting	*Oct*
	• Groups and Clusters of Galaxies at the Crossroad between Astrophysics and Cosmology at Aspen	*Aug*
	• *CMB-S4 Workshop	*Aug*
2022	• ICML International Conference on Machine Learning	*July*
	• Plenary talk at Dark Energy Survey Collaboration Meeting	*May*
	• *Colloquium, LMU	*May*
	• Colloquium, ASIAA	*May*
	• Advances in Cosmology through Numerical Simulations	*May*
	• Galaxy Clusters 2022: Challenging Our Cosmological Perspectives	*April*
2021	• Cluster Mass 2020	*Sep*
	• Colloquium, ASIAA	*Jan*
2020	• Survey science group meeting, University of Chicago	*Nov*
	• *Gravitational lensing group seminar, LMU	*Nov*
	• *Seminar at Stony Brook University	*Nov*
	• *Dark Sector Meeting, JPL	*Oct*
	• Cosmology Lunch, Princeton University	*Oct*
	• Cosmic surveys meeting, Fermilab	*Oct*
	• *CCAPP Seminar, OSU	*Oct*
	• *Cosmology Seminar, University of California, Berkeley	*Sep*

	• *11th CMB-S4 Workshop: Cosmology and Astrophysics in the Next Decade	*Aug*
	• Cosmology from Home	*Aug*
	• Dark Energy Survey Virtual Collaboration Meeting	*May*
2019	• Dark Energy Survey Collaboration Meeting	*Nov*
	• Cosmic Controversies	*Sep*
	• Great Lake Cosmology Workshop	*Aug*
	• Dark Energy Survey Collaboration Meeting	*May*
	• Panchromatic Panoramic Studies of Galaxy Clusters	*March*
2018	• Dark Energy Survey Y3KP workshop	*Oct*
	• Tucson DECaLS Workshop	*Aug*
	• Santa Cruz Galaxy Workshop	*Aug*

REFERENCES

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- Eduardo Rozo   Email: erozo@arizona.edu
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- Risa H. Wechsler   Email: rwechsler@stanford.edu
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  Stanford, CA 94305, USA

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