

HAOWEN ZHANG/张昊文/張昊文

CURRICULUM VITAE

CONTACT INFORMATION:

Canadian Institute for Theoretical Astrophysics
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RESEARCH AREAS:

Topics: Supermassive Black Holes, Galaxy Formation & Evolution
Methods: Empirical Modeling, Observations, Machine Learning, Hydrodynamical Simulations

EDUCATION AND APPOINTMENTS:

CITA Postdoctoral Fellow, Canadian Institute of Theoretical Astrophysics	09/2025—Current
Postdoctoral Researcher; University of Arizona	07/2024—08/2025
Ph.D., Astronomy and Astrophysics; University of Arizona	08/2018—05/2024
B.Sc., Astronomy; Peking University	09/2014—06/2018

PUBLICATIONS (28 IN TOTAL, TOTAL CITATIONS: 1405):

1. **Zhang**, Behroozi, Volonteri et al., “[TRINITY VI: Connection between Galaxy Star Formation Rates and Supermassive Black Hole Accretion Rates from \$z = 0 - 10\$](#) ”, MNRAS, 538, 503 (2025)
2. **Zhang**, Behroozi, Volonteri et al., “[TRINITY IV: Predictions for Supermassive Black Holes at \$z \geq 7\$](#) ”, MNRAS, 531, 4974 (2024)
3. **Zhang**, Behroozi, Volonteri et al., “[TRINITY III: Quasar Luminosity Functions Decomposed by Halo, Galaxy, and Black Hole Masses and Eddington Ratios from \$z=0-10\$](#) ”, MNRAS, 529, 2777 (2024)
4. **Zhang**, Behroozi, Volonteri et al., “[TRINITY II: The Luminosity-dependent Bias of the Supermassive Black Hole Mass--Galaxy Mass Relation for Bright Quasars at \$z=6\$](#) ”, MNRAS, 523, L59 (2023)
5. **Zhang**, Behroozi, Volonteri et al., “[TRINITY I: Self-Consistently Modeling the Dark Matter Halo–Galaxy–Supermassive Black Hole Connection from \$z=0-10\$](#) ”, MNRAS, 518, 2123 (2023)
6. **Zhang**, Primack, Faber, Koo, et al., “[The evolution of galaxy shapes in CANDELS: from prolate to discy](#)”, MNRAS 484, 5170 (2019).
7. **Zhang**, Yang & Wu, “[Broadband Photometric Reverberation Mapping Analysis on SDSS-RM and Stripe 82 Quasars](#)”, ApJ 853, 116 (2018).

8. Hasan, **Zhang**, Pandya et al., “[Impact of Cosmic Filaments on Galaxy Morphological Evolution and Predictions of Early Cosmic Web Structure for Roman](#)”, submitted to ApJ
9. Knox, **Zhang**, & Behroozi, “[Trinity VII. Predictions for the Observable Correlation Functions of Accreting Black Holes](#)”, submitted to OJAp.
10. Pandya, **Zhang**, Huertas-Company et al., “[Galaxies Going Bananas: Inferring the 3D Shapes of High-Redshift Galaxies with JWST-CEERS](#)”, ApJ, 963, 54
11. Lin et al. (incl. **H. Zhang**), “[Bridging Quasars and Little Red Dots: Insights into Broad-Line AGNs at \$z=5-8\$ from the First JWST COSMOS-3D Dataset](#)”, submitted to ApJ
12. Lin, Egami, Sun, **Zhang**, et al., “[The Luminosity Function and Clustering of \$H\alpha\$ Emitting Galaxies at \$z \approx 4-6\$ from a Complete NIRCам Grism Redshift Survey](#)”, submitted to ApJ
13. Champagne, Wang, **Zhang** et al., “[A Quasar-Anchored Protocluster at \$z = 6.6\$ in the ASPIRE Survey: I. Properties of \[OIII\] Emitters in a 10 Mpc Overdensity Structure](#)”, ApJ, 981, 113
14. Tanaka et al. (incl. **H. Zhang**), “[Discovery of a Little Red Dot candidate at \$z \geq 10\$ in COSMOS-Web based on MIRI-NIRCам selection](#)”, submitted to ApJ
15. Lin et al. (incl. **H. Zhang**), “[The Discovery of Little Red Dots in the Local Universe: Signatures of Cool Gas Envelopes](#)”, submitted to ApJ
16. Onoue et al. (incl. **H. Zhang**), “[A Post-Starburst Pathway to Forming Massive Galaxies and Their Black Holes at \$z > 6\$](#) ”, accepted by Nature Astronomy
17. Taylor et al. (incl. **H. Zhang**), “[Broad-Line AGN at \$3.5 < z < 6\$: The Black Hole Mass Function and a Connection with Little Red Dots](#)”, ApJ, 986, 165
18. Champagne et al. (incl. **H. Zhang**), “[A Quasar-Anchored Protocluster at \$z = 6.6\$ in the ASPIRE Survey: II. An Environmental Analysis of Galaxy Properties in an Overdense Structure](#)”, ApJ, 981, 114
19. Liu et al. (incl. **H. Zhang**), “[Fast Outflow in the Host Galaxy of the Luminous \$z = 7.5\$ Quasar J1007+2115](#)”, ApJ, 976, 33
20. Lin et al. (incl. **H. Zhang**), “[A SPECTROSCOPIC survey of biased halos In the Reionization Era \(ASPIRE\): Broad-line AGN at \$z=4-5\$ revealed by JWST/NIRCам WFSS](#)”, ApJ, 974, 147
21. Eilers et al. (incl. **H. Zhang**), “[EIGER VI. The Correlation Function, Host Halo Mass and Duty Cycle of Luminous Quasars at \$z \geq 6\$](#) ”, ApJ, 974, 275
22. Li et al. (incl. **H. Zhang**), “[A Tentative Lensed Rotating Disk at \$z = 8.34\$ detected by JWST NIRCам WFSS with Dynamical Forward Modeling](#)”, submitted to ApJL
23. Wang et al. (incl. **H. Zhang**), “[A SPECTROSCOPIC Survey of Biased Halos in the Reionization Era \(ASPIRE\): JWST Reveals a Filamentary Structure around a \$z = 6.61\$ Quasar](#)”, ApJL, 951, L4 (2023)
24. Yang et al. (incl. **H. Zhang**), “[A SPECTROSCOPIC survey of biased halos In the Reionization Era \(ASPIRE\): A First Look at the Rest-frame Optical Spectra of \$z > 6.5\$ Quasars Using JWST](#)”, ApJL, 951, L5 (2023)
25. Larson et al. (incl. **H. Zhang**), “[A CEERS Discovery of an Accreting Supermassive Black Hole 570 Myr after the Big Bang: Identifying a Progenitor of Massive \$z > 6\$ Quasars](#)”, ApJL, 953, L29 (2023)
26. Huertas-Company et al. (incl. **H. Zhang**), “[Stellar masses of giant clumps in CANDELS and simulated galaxies using machine learning](#)”, MNRAS 499, 814
27. Pandya et al. (incl. **H. Zhang**), “[Can intrinsic alignments of elongated low-mass galaxies be used to map the cosmic web at high redshift?](#)”, MNRAS 488, 5580

AWARDS & GRANTS AWARDED:

1. 2024 [College of Science Outstanding Graduate Student Award for Scholarship](#) (College of Science Overall Winner and Winner in Astronomy), UArizona
2. 2023 [Theoretical Astrophysics Program \(TAP\) Graduate Student Research Prize](#), UArizona

As Co-Investigator:

JWST Cycle 3: COSMOS-3D: A Legacy Spectroscopic/Imaging Survey of the Early Universe, GO 5893 (PI: Koki Kakiichi)

JWST Cycle 3: Investigating an Extreme [OIII] Outflow Discovered in a Reionization-era Luminous Quasar, GO 4691 (PI: Jinyi Yang)

JWST Cycle 3: Mapping Cosmic Structure Evolution: Characterizing Two Massive Galaxy Protoclusters Anchored by $z > 7.5$ Luminous Quasars, GO 5221 (PI: Maria Pudoka)

JWST Cycle 2, MAGNIF: Medium-band Astrophysics with the Grism of NIRC2 in Frontier Fields, GO 2883 (PI: Fengwu Sun)

JWST Cycle 2, Mapping the Most Extreme Protoclusters in the Epoch of Reionization, GO 3325 (PI: Feige Wang)

JWST Cycle 2, Quasar Feedback and Supermassive Black Hole Demographics at $z \sim 4-6$, GO 3428 (PI: Weizhe Liu)

JWST Cycle 1, A Spectroscopic survey of biased halos In the Reionization, GO 2078 (PI: Feige Wang)

HST Cycle 28, Confirming a Gravitationally Lensed Quasar Candidate at $z=5.07$, GO 16460 (PI: Minghao Yue)

SELECTED TALKS:

LOCATION	DATE
Tinsley Workshop, Yale	10/28/2024
Cosmic Origins: The First Billion Years, KITP, UCSB† (video)	09/12/2024
Santa Cruz Galaxy Workshop 2024†, Santa Cruz	08/02/2024
Theoretical Astrophysics Seminar, CIERA, Northwestern University	04/25/2024
Blackboard Talk: Galaxy Morphologies and Kinematics, KICP, UChicago	04/23/2024
Space Drafts Public Talk #96: Galaxies Going Bananas, Tucson (video)	03/19/2024
UC Santa Cruz Cosmology/Galaxies/IGM Seminar†	11/20/2023
Center for Astrophysical Sciences (CAS) Wine and Cheese Seminar, JHU/STScI	09/25/2023
Galaxy Seminar, Caltech	09/22/2023
Theoretical Astrophysics Program (TAP) Colloquium†, UArizona	09/11/2023
Santa Cruz Galaxy Workshop 2023†, Santa Cruz (video)	08/10/2023
Space Drafts Public Talk #88: Supermassive Black Holes, Tucson (video)	06/20/2023
First Light Conference, MIT	06/12/2023
100 th Year Anniversary Public Talk, Steward Observatory, UArizona	04/22/2023
Seminar, Columbia University	04/06/2023
Monday Afternoon Talk, MIT Kavli Institute	04/03/2023

ITC Luncheon, CfA, Harvard (video)	03/30/2023
Slides Talk, KITP, UCSB (video)	03/21/2023
Blackboard Talk, KITP, UCSB (video)	03/16/2023
Galaxy Coffee, MPIA, Germany	10/06/2022
Seminar Galaxies, IAP, France	09/22/2022
UC Santa Cruz Galaxy Workshop 2022†	08/23/2022
UC Santa Cruz Cosmology/Galaxies/IGM Seminar†	07/11/2022
Annual Meeting of the Astronomische Gesellschaft 2020	09/23/2020

†: Invited Talks

PUBLIC SERVICE & OUTREACH:

Author of the open-source [TRINITY](#) galaxy & supermassive black hole evolution model.
 Referee for *ApJ* (2019-present), *Nature Astronomy* (2024-present), and *MNRAS* (2025-present)
 Panelist Reviewer for National Science Foundation (NSF; 2025-present)
 Distributed Proposal Reviewer for *Chandra* X-ray Telescope (2025-present)
 Participant in the [Letters to a Pre-Scientist Program](#): 2023-present

PRESS:

1. “NASA's James Webb Space Telescope finds 'surfboard' galaxies in the early universe” (2024), covered in [New York Times](#), [CBS News](#), [NASA](#), etc. (Second author of the research, which extended one of my previous works: “[The evolution of galaxy shapes in CANDELS: from prolate to discy](#)”)
2. “Machine learning reveals how black holes grow” (2022), covered in [Alpha Galileo](#), [phys.org](#), etc. (Leading author of the research)

DEPARTMENTAL SERVICE:

1. Pairing Committee of the International Scholar Allyship Program, the International Scholar Taskforce, Steward Observatory Diversity, Equity, and Inclusion Movement (09/2022-09/2024)
2. Member of the International Scholar Taskforce, Steward Observatory Diversity, Equity, and Inclusion Movement (05/2022-09/2025)
3. Organizing Committee of 2021 Steward Observatory Prospective Student Visit (02/2021-03/2021)
4. Representative of the International Scholar Taskforce, Steward Observatory Diversity, Equity, and Inclusion Movement (08/2020-10/2020).

RESEARCH MENTEES ADVISED/CO-ADVISED:

[Oddisey Knox](#)

UArizona

2021-present

Our paper: “TRINITY VII: Predictions for the Observable Correlation Functions of Accreting Black Holes”, submitted to Open Journal of Astrophysics. [arXiv:2506.05612](#)

TEACHING EXPERIENCE:

ASTR 300A	Dynamics in Astrophysics	Spring 2023	UArizona	TA
ASTR 201	Cosmology	Fall 2020	UArizona	TA

REFERENCES (ALPHABETICAL ORDER):

Peter Behroozi	Associate Professor, University of Arizona	pbehroozi@gmail.com
Sandra Faber	Professor, UC Santa Cruz†	faber@ucolick.org
Xiaohui Fan	Professor, University of Arizona	fan@as.arizona.edu
David Koo	Professor, UC Santa Cruz†	koo@ucolick.org
Joel Primack	Professor, UC Santa Cruz†	joel@ucsc.edu
Joseph Silk	Professor, Johns Hopkins University/Oxford/IAP	silk@iap.fr
Marta Volonteri	Directrice de Recherche, CNRS, France	martav@iap.fr
Xue-Bing Wu	Professor, Peking University	wuxb@pku.edu.cn

†: Emeritus / Emerita.

PROFESSIONAL SKILLS:

Programming: C/C++, Python, CUDA, Git, Fortran, Mathematica
Scientific Writing: LaTeX