

# Yuhan Yao

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## PRIMARY RESEARCH INTERESTS

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- Time domain astronomy; High energy astrophysics; Sky surveys
- Tidal disruption events; Deaths of massive stars; Accretion and jet physics; Intermediate-mass black holes

## EDUCATION

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2020-2023	Ph.D., Astrophysics, California Institute of Technology, USA Thesis: <a href="#">High Energy Transients Powered by Black Holes</a> Advisors: Prof. Shrinivas R. Kulkarni & Prof. Fiona A. Harrison
2018-2020	M. Sc. Astrophysics, California Institute of Technology, USA
2014-2018	B. Sc. Astronomy, Peking University, China

## APPOINTMENTS

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2023-present	<b>Miller Fellow</b> Miller institute for Basic Research in Science, University of California, Berkeley
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## SELECTED HONORS and AWARDS

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2023	Miller Fellowship Award, University of California, Berkeley
2021	Garmire Scholarship, Caltech
2017	Study Abroad Scholarship for Outstanding Students, China Scholarship Council
2017	Summer Undergraduate Research Fellowship, Caltech

## SUCCESSFUL OBSERVING PROPOSALS AS PRINCIPAL INGESTIGATOR

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Total grants obtained as PI: <b>\$425k</b>	
X-ray	15 proposals: 7 <i>NuSTAR</i> (560ks), 3 <i>NICER</i> (700ks), 3 <i>XMM-Newton</i> (293ks), 2 <i>Chandra</i> (115ks) <ul style="list-style-type: none"><li>• <i>NuSTAR</i> GO: three (2 x Cycle 7, Cycle 10): totaling 260ks</li><li>• <i>NuSTAR</i> DDT: four (2 x Cycle 6, 2 x Cycle 7), totaling 300ks</li><li>• <i>NICER</i> GO: two (Cycle 4, 5), totaling 600ks</li><li>• <i>NICER</i> DDT: one (Cycle 4), totaling 100ks</li><li>• <i>XMM-Newton</i> GO: two (AO-21, AO-23), totaling 253 ks</li><li>• <i>XMM-Newton</i> DDT: one (AO-24), totaling 40ks</li><li>• <i>Chandra</i> GO: one (Cycle 23), totaling 75ks</li><li>• <i>Chandra</i> DDT: one (Cycle 22), totaling 40ks</li><li>• <i>Swift</i> ToO: numerous, totaling &gt;400ks</li></ul>
Radio	5 proposals: 5 VLA (56.9hr) <ul style="list-style-type: none"><li>• VLA Regular: two (23A, 24A): totaling 43.1hr</li><li>• VLA DDT: two (2x20B, 23B): totaling 14.5hr</li></ul>

## LEADERSHIP & PROFESSIONAL SERVICE

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2023-present	UCB Astronomy Diversity, Equity, Inclusion & Climate Committee Postdoc Representative
2023-present	Co-chair, LS4 Massive Black Hole science working group
2022-present	Referee/reviewer for ApJ, ApJ Letters, MNRAS
2022-present	Member, Advanced X-ray Imaging Satellite ( <i>AXIS</i> ) TDA&MM working group
2021-present	Member, Ultraviolet Explorer ( <i>UVEX</i> ) Legacy Survey working group
2020-21	Organizer, Weekly ZTF AGN/TDE science working group discussion
2019-21	Co-organizer, Weekly ZTF Caltech transient discussion
2020	Time Allocation Committee (Palomar Hale Telescope; Liverpool Telescope)
2020	Co-organizer, <a href="#">Caltech X-ray Club</a> (34 lectures given by PIs or members of X-ray missions)
2019-21	Peer Mentor, Caltech Astronomy Mentorship Program

PUBLICATION SUMMARY & SELECTED HIGHLIGHTS

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- **As first author: 11**
- Total: 74 (including 2 white papers and 4 submitted under review)
- Citations: >2200 / >**300**
- h-index: 29 / **10**

**First Author Journal Publications**

- [11] **Yao, Y.**, Lu, W., Harrison, F., et al. 2023, [ApJ, 965, 39](#)  
*The On-axis Relativistic Tidal Disruption Event AT2022cmc:  
X-ray Observations and Broadband Spectral Modeling*
- [10] **Yao, Y.**, Ravi, V., Gezari, S., et al. 2023, [ApJL, 955, L6](#)  
*Tidal Disruption Event Demographics with the Zwicky Transient Facility:  
Volumetric Rates, Luminosity Function, and Implications for the Local Black Hole Mass Function*
- [9] **Yao, Y.**, Lu, W., Guolo, M. et al. 2022, [ApJ, 937, 8](#)  
*The Tidal Disruption Event AT2021ehb:  
Evidence of Relativistic Disk Reflection, and Rapid Evolution of the Disk—Corona System*
- [8] **Yao, Y.**, Ho, Y. Q. A., Medvedev, P. et al., 2022, [ApJ, 934, 104](#)  
*The X-ray and Radio Loud Fast Blue Optical Transient AT2020mrf:  
Implications for an Emerging Class of Engine-driven Massive Star Explosions*
- [7] **Yao, Y.**, Kulkarni S. R., Gendreau, K. C. et al., 2021, [ApJ, 920, 121](#)  
*A Comprehensive X-ray Report on AT2019wey*
- [6] **Yao, Y.**, Kulkarni, S. R., Burdge, K. B. et al., 2021, [ApJ, 920, 120](#)  
*Multi-wavelength Observations of AT2019wey: a New Candidate Black Hole Low-mass X-Ray Binary*
- [5] **Yao, Y.**, De, K., Kasliwal, M. M. et al., 2020 August 31, [ApJ, 900, 46](#) (24 pages)  
*SN2019dge: a Helium-rich Ultra-Stripped Envelope Supernova*
- [4] **Yao, Y.**, Miller, A. A., Kulkarni, S. R. et al., 2019, [ApJ, 886, 152](#)  
*ZTF Early Observations of Type Ia Supernovae. I. Properties of the 2018 Sample*
- [3] **Yao, Y.** & Feng, H. 2019 October 3, [ApJL, 884, L3](#)  
*A Wind-disk Self-irradiation model for Supercritical Accretion*
- [2] **Yao, Y.**, Meyer, M. R., Covey, K. R. et al., 2018, [ApJ, 869, 72](#)  
*IN-SYNC. VIII. Primordial Disk Frequencies in NGC 1333, IC 348, and the Orion A Molecular Cloud*
- [1] **Yao, Y.**, Liu, C., Deng, L., et al. 2017, [ApJS, 232, 16](#)  
*Mira Variable Stars from LAMOST DR4 Data:  
Emission Features, Temperature Types, and Candidate Selection*

**Selected Co-author Publications (with Significant Contribution)**

- [13] Somalwar, J., Ravi, V., **Yao, Y.** et al. 2023, submitted, [arxiv: 2310.03782](#)  
*The first systematically identified repeating partial tidal disruption event*
- [12] Guolo, M., Gezari, S., **Yao, Y.** et al. 2023, submitted, [arxiv: 2308.13019](#)  
*A systematic analysis of the X-ray emission in optically selected tidal disruption events:  
observational evidence for the unification of the optically and X-ray selected populations*
- [11] Andreoni, I., Coughlin, M. W., Perley, D. A., **Yao, Y.** et al. 2022, [Nature, 612, 430](#)  
*A very luminous jet from the disruption of a star by a massive black hole*
- [10] Ho, Y. Q. A., Perley, D. A., **Yao, Y.** et al. 2022, [ApJ, 938, 85](#)  
*Cosmological Fast Optical Transients with the Zwicky Transient Facility: A Search for Dirty Fireballs*
- [9] Ho, Y. Q. A., Margalit, B., Bremer, M., Perley, D. A., **Yao, Y.** et al., 2022, [ApJ, 932, 116](#)  
*Luminous Millimeter, Radio, and X-Ray Emission from ZTF 20acigmel (AT 2020xnd)*
- [8] Perley, D. A., Sollerman, J., Schulze, S., **Yao, Y.** et al., 2022, [ApJ, 927, 180](#)  
*The Type Icn SN 2021csp:  
Implications for the Origins of the Fastest Supernovae and the Fates of Wolf-Rayet Stars*
- [7] Sazonov, S., Gilfanov, M., Medvedev, P., **Yao, Y.** et al. 2021, [MNRAS, 508, 3820](#)

*First tidal disruption events discovered by SRG/eROSITA:*

*X-ray/optical properties and X-ray luminosity function at  $z < 0.6$*

- [6] Perley, D. A., Ho, Y. Q. A., **Yao, Y.** et al. 2021, [MNRAS](#), **508**, 5138

*Real-time Discovery of AT2020xnd: A Fast, Luminous Ultraviolet Transient with Minimal Radioactive Ejecta*

- [5] Yadlapalli, N., Ravi, V., **Yao, Y.** et al. 2021, [ApJL](#), **909**, L27

*VLBA Discovery of a Resolved Source in the Candidate Black Hole X-ray Binary AT2019wey*

- [4] Piro, A. L., Haynie, A., **Yao, Y.** 2021, [ApJ](#), **909**, 209

*Shock Cooling Emission from Extended Material Revisited*

- [3] Bulla, M., Miller, A. A., **Yao, Y.** et al. 2020, [ApJ](#), **902**, 48

*ZTF Early Observations of Type Ia Supernovae III:*

*Early-Time Colors as a Test for Explosion Models and Multiple Populations*

- [2] Miller, A. A., **Yao, Y.**, Bulla, M. et al. 2020, [ApJ](#), **902**, 47

*ZTF Early Observations of Type Ia Supernovae II:*

*First Light, the Initial Rise, and Time to Reach Maximum Brightness*

- [1] Zhou, Y., Feng, H., Ho, L. C., **Yao, Y.** 2019, [ApJ](#), **871**, 115

*Evidence for Optically Thick, Eddington-limited Winds Driven by Supercritical Accretion*

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## TEACHING AND MENTORING

### Teaching

Spring 2020	TA for Ay125 at Caltech (graduate course, “High Energy Astrophysics”)
Winter 2020	TA for Ay102 at Caltech (undergraduate course, “Physics of ISM”, taught 2 lectures)
Fall 2019	TA for Ay121 at Caltech (graduate course, “Radiative Processes”)
2019-20	TA, GROWTH Summer School

### Student Mentoring

2024/05-present	Supervisor for UC Berkeley undergraduate student Aditi Anand
2023/06-2024/04	Supervisor for Hong Kong University undergraduate student Vismaya Pillai

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## PRESS COVERAGE

- 2023/03 [Caltech magazine](#) featuring my TDE studies in honor of NASA black hole week
- 2022/12 [NASA-JPL news-release](#) on my study of AT2021ehb (see a short writeup on [yahoo!life](#))
- 2022/01 I presented AT2020mrf at the 239<sup>th</sup> AAS press conference [[video](#)], which received some media attention (e.g., [Caltech News](#), [Scientific American](#), [Science News](#), [IFLScience](#), [BigThink](#), [spacecom](#))

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## PUBLIC OUTREACH

- 2023 Speaker, Caltech Stargazing Lecture Series, *Fireworks from Black Holes Devouring Stars*
- 2023 Speaker, 241<sup>th</sup> AAS AXIS Splinter Session, *Transient Science with the AXIS Probe Mission*
- 2022 Speaker, 240<sup>th</sup> AAS NASA Hyper-wall Booth, *NuSTAR: Ten Years of the High Energy Universe in Focus*
- 2021 Interviewee, KAZN AM1300 Radio Station (in Mandarin), *Life as a Scientist at Caltech*
- 2021 Speaker, Astronomy on Tap (virtual, in Mandarin), *Searching for Stars Ripped Apart by Black Holes*
- 2020 Speaker, Amateur Astronomical Society, *Finding Supernovae from Mt. Palomar*
- 2019 Speaker, ZTF Summer Institute, *Early Observations of Type Ia Supernovae by ZTF*
- 2018-23 Volunteer, Caltech Astronomy Outreach Program

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## INVITED CONFERENCE TALKS

- 2024/04 Conference *Anticipating the Rising Tide of Tidal Disruption Events*, KITP, Santa Barbara, CA
- 2024/04 The 21<sup>st</sup> HEAD Meeting TDE Special Session, Horseshoe Bay, TX
- 2023/12 The 32<sup>nd</sup> Texas Symposium on Relativistic Astrophysics, Shanghai, China
- 2023/09 ZTF Theory Network, Santa Margarita, CA
- 2022/10 Workshop on Super-massive Black Holes, Cornell University, Ithaca, NY
- 2022/09 ZTF Theory Network, Santa Margarita, CA
- 2022/09 NICER 2022 Proposal and Science Workshop, Online meeting
- 2022/06 NuSTAR 10-yr Anniversary Science Meeting, Cagliari, Sardinia, Italy (remote talk)

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## INVITED COLLOQUIA / SEMINARS

2024/02	Cosmology and Astronomy Seminar, UC Davis, CA
2024/02	Colloquium, Department of Astronomy and Astrophysics, UC Santa Cruz, CA
2023/10	High Energy and Astrophysics Seminar, University of Utah, Salt Lake City, UT
2022/12	AXIS Seminar, Virtual
2022/10	Seminar, Theoretical Astrophysics Center, UC Berkeley, Berkeley, CA
2022/10	Seminar, Center for Cosmology and Astroparticle Physics, Ohio State University, Columbus, OH
2022/09	Colloquium, Department of Astronomy, University of Maryland, College Park, MD
2021/12	Explosive Seminar, UC Berkeley, Berkeley, CA

#### SELECTION OF CONTRIBUTED TALKS

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2023/03	<i>UVEX</i> Community Workshop, Pasadena, CA
2023/01	PhD Dissertation Talk, 241 <sup>th</sup> AAS Meeting, Seattle, WA
2022/06	Theoretical High Energy Astrophysics Group Meeting, U. Columbia, New York, NY
2021/11	ZTF Collaboration Meeting, virtual
2020/10	ZTF Theory Network, virtual
2019/08	Hot Wiring Transient VI Meeting, Evanston, IL
2019/08	GROWTH Collaboration Meeting, San Diego, CA

#### OBSERVING EXPERIENCE

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Keck-I telescope, the Low Resolution Imaging Spectrometer (LRIS) – more than 20 nights  
Palomar Hale telescope, the Double Spectrograph (DBSP) – more than 20 nights  
Keck-II telescope, the Echellette Spectrograph and Imager (ESI) – 5 nights  
Lick Shane telescope, the KAST spectrograph – 3 nights