

MING-FENG HO (何銘峰)

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 Ann Arbor, MI

CURRENT POSITION

- Postdoctoral Fellow, Leinweber Institute for Theoretical Physics, University of Michigan 2024–present
Faculty mentor: Camille Avestruz
Member, DESI Collaboration (Lyman- α working group), 2024–

EDUCATION

- Ph.D. in Physics & Astronomy, University of California, Riverside 2024
Research advisor: Prof. Simeon Bird
Thesis: Model-driven cosmology with Bayesian machine learning and population inference
- M.S. in Astrophysics, National Taiwan University 2016 - 2018
- B.S. in Physics, National Taiwan University 2010 - 2014

RESEARCH INTERESTS

- **Small-scale cosmology:** Lyman- α forest, matter-power shape, high-column-density absorbers, fundamental physics from nonlinear scales.
- **Inference methods:** Bayesian hierarchical modeling, simulation-based inference, Gaussian processes, multi-fidelity emulation; also applied to gravitational-wave black-hole population inference.

PUBLICATIONS

Summary

- First-author measurement of the small-scale matter-power amplitude and slope from high-resolution Lyman- α spectra (KODIAQ-SQUAD/XQ-100; JCAP 2026), built on multi-fidelity emulators I developed; now extending that absorber inference toward population inference.
- GP-DLA pipeline adopted in the DESI DR2 Ly α BAO DLA catalogue as one of three complementary finders and as the common absorber redshift and column-density estimator.
- 24 refereed publications (2,299 citations; h-index 12; Google Scholar, Aug. 2026).
- 6 first-author publications.
- Google Scholar: Full list

First-authored papers

- **Ming-Feng Ho**, Mahdi Qezlou, Simeon Bird, Yanhui Yang, Camille Avestruz, Martin A. Fernandez, Vid Iršič, *Small-scale Lyman-alpha forest cosmology with PRIYA: constraints from XQ-100 and KODIAQ-SQUAD one-dimensional flux power spectra*, JCAP 07 (2026) 094 [2509.18271].
- **Ming-Feng Ho**, Scott Ellis Perkins, Simeon Bird, William Dawson, Nathan Golovich, Jessica R. Lu, Peter McGill, *Investigating the mixing between two black hole populations in LIGO-Virgo-KAGRA GWTC-3*, Phys. Rev. D 110, 063031, September 2024 [2408.09024].

- **Ming-Feng Ho**, Simeon Bird, Martin A. Fernandez, Christian R. Shelton, *MF-Box: Multi-fidelity and multi-scale emulation for the matter power spectrum*, *MNRAS*, 526(2):2903–2919, December 2023 [2306.03144].
- **Ming-Feng Ho**, Simeon Bird, Christian R. Shelton, *Multi-Fidelity Emulation for the Matter Power Spectrum using Gaussian Processes*, *MNRAS*, 509(2):2551–2565, January 2022 [2105.01081].
- **Ming-Feng Ho**, Simeon Bird, and Roman Garnett, *Damped Lyman-alpha Absorbers from Sloan Digital Sky Survey DR16Q with Gaussian processes*, *MNRAS*, 507(1):704–719, October 2021 [2103.10964].
- **Ming-Feng Ho**, Simeon Bird, and Roman Garnett, *Detecting multiple DLAs per spectrum in SDSS DR12 with Gaussian processes*, *MNRAS*, 496(4):5436–5454, August 2020 [2003.11036].

Selected co-authored publications

- Y. Yang, S. Bird, **M.-F. Ho**, M. Qezlou, *Ten-dimensional neural network emulator for the nonlinear matter power spectrum*, *Phys. Rev. Lett.* 136, 061001, 2026 [2507.07177].
- A. Brodzeller, M. Wolfson, D. M. Santos, **M.-F. Ho**, T. Tan, M. M. Pieri, A. Cuceu, et al., *Construction of the damped absorber catalog for DESI DR2 Ly α BAO*, *Phys. Rev. D* 112, 083510, 2025 [2503.14740] — GP-DLA finder; absorber redshifts and column densities.
- H. M. Tohfa, S. Bird, **M.-F. Ho**, M. Qezlou, M. A. Fernandez, *Forecast cosmological constraints with the 1D wavelet scattering transform and the Lyman- α forest*, *Phys. Rev. Lett.* 132, 231002, 2024 [2310.06010].
- M. A. Fernandez, S. Bird, **M.-F. Ho**, *Cosmological constraints from the eBOSS Lyman- α forest using the PRIYA simulations*, *JCAP* 2024(07):029 [2309.03943].
- M. A. Fernandez, **M.-F. Ho**, S. Bird, *A multifidelity emulator for the Lyman- α forest flux power spectrum*, *MNRAS* 517(3):3200–3211, 2022 [2207.06445].

FELLOWSHIPS AND AWARDS

Leinweber Postdoctoral Fellowship, University of Michigan	2024 -
Robert Poe (浦大邦) Memorial Scholarship, UC Riverside	2024
Carnegie Student Fellowship (awarded)	2024
NASA FINESST Fellowship (awarded on own proposal)	2021 - 2024
Anne Kernan Award and Benjamin C. Shen Award (outstanding graduate student researcher), UC Riverside	2023, 2021

RESEARCH SOFTWARE

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- `gp_dla_finder` (author) — Gaussian-process detection of damped Lyman- α absorbers in quasar spectra; the reusable core of the finder used in DESI damped-absorber catalogue construction. [repository]
 - `hcd_priya` (HCDemu; author) — differentiable emulator of the clean-forest and high-column-density contributions to the Lyman- α flux power spectrum, with documentation, usage examples and validation material. [repository]
 - `MF-Box` (author) — multi-fidelity, multi-scale emulation for the matter power spectrum. [repository]

RESEARCH MENTORSHIP

- Aidan Behmer (University of Michigan, Undergraduate): Symbolic emulator for Lyman- α power spectrum; paper in preparation 2025–
- Alexandra Wells (University of Michigan, Graduate): Clustering measurements of damped Lyman- α absorbers in DESI DR2 2025–
- Undergraduate researcher (University of Michigan Undergraduate Research Opportunity Program): Cross-simulation comparison of Lyman- α forest observables with CAMELS 2026–
- Earlier projects (2020–2023): five undergraduate and high-school research projects at UC Riverside and UCLA, on Lyman-limit-system detection, DLA detection pipelines, quasar-redshift priors (county science-fair gold medal), deep-learning classification (LLNL Data Challenge), and cosmological visualisation.

SCIENTIFIC PRESENTATIONS

Invited seminars and colloquia

- *Perimeter Institute Cosmology Talk (topic: Small-scale Lyman alpha forest cosmology with PRIYA and KODIAQ-SQUAD-XQ100)* Nov 2025
- *Midwest Cosmology Seminar (topic: Small-scale Lyman alpha forest cosmology with PRIYA and KODIAQ-SQUAD-XQ100)* Oct 2025
- *OSU CCAPP Seminar (topic: Bayesian modeling of damped Lyman alpha absorbers in DESI)* Mar 2025
- *CfA Seminar (topic: Multi-fidelity emulators and cosmological constraints)* Nov 2023
- *IPMU APEC seminar (topic: PRIYA emulator using Astrid simulations)* Oct 2023
- *KICP seminar (topic: MF emulator)* Jan 2023

Selected conference and workshop talks

- “*Seeing the Forest from the Mountains: How Small a Scale Can Lyman- α Cosmology Probe?*”
Dark Frontiers, NCSA, University of Illinois Urbana-Champaign Aug 2026
- “*From eBOSS to DESI Y3: Revisiting DLA Population Statistics in Large Cosmological Surveys*”
Celebrating 40 Years of Damped Lyman- α Systems, Kavli IPMU, Kashiwa, Japan Mar 2026
- GP-DLA update
Lyman- α Forest Full-Shape Analysis Workshop, Ohio State University Sep 2025

SERVICE

Selected service

- Referee for Physical Review D, Astrophysical Journal, JCAP, and MNRAS 2021 - present
- Contributor, DESI Lyman- α working group: damped-absorber catalogue construction, contamination catalogue for DR2 BAO and full-shape analyses 2024 - present
- P&A Student Seminar (PASS) Founder 2022 - 2023

LANGUAGES

- Mandarin Chinese (native); English (fluent)