Lehman H. Garrison

Cosmology — Large-Scale Structure
High-Performance Computing —
N-body Simulations

Center for Computational Astrophysics
Flatiron Institute
162 Fifth Ave, New York, NY 10010
website: lgarrison.github.io
email: lgarrison@flatironinstitute.org

Employment

Flatiron Research Fellow 2019–present
Cosmology X Data Science Group
Center for Computational Astrophysics
Flatiron Institute, New York, NY

Education

Ph.D., Astronomy and Astrophysics 2013–2019
Harvard University, Cambridge, MA
Thesis: *Computational Modeling of Large-Scale Structure with Abacus*
Advisor: Daniel J. Eisenstein

B.A., Astrophysical Sciences (High Honors) 2009–2013
Princeton University, Princeton, NJ
Thesis: *Galactic Warp Excitation by the Magellanic Clouds*
Advisors: David N. Spergel, Naoki Yoshida (U. Tokyo)

Awards and Honors

Eric Keto Prize April 2019
for Best Ph.D. Thesis in Theoretical Astrophysics at Harvard University

Smith Family Graduate Science and Engineering Fellowship
Harvard University 2013

Sigma Xi Book Award, Best Senior Thesis in Astronomy June 2013
Department of Astrophysical Sciences, Princeton University

Selected Publications

First Author Publications

4. *Generating approximate halo catalogues for blind challenges in precision cosmology*, **Garrison, L. H.**, & Eisenstein, D. J. 2019, Monthly Notices of the Royal Astronomical Society, 485, 2407
3. *A high-fidelity realization of the Euclid code comparison N-body simulation with Abacus*, **Garrison, L. H.**, Eisenstein, D. J., & Pinto, P. A. 2019, Monthly Notices of the Royal Astronomical Society, 485, 3370
2. *The abacus cosmos: a suite of cosmological N-body simulations*, **Garrison, L. H.**, Eisenstein, D. J., Ferrer, D., et al. 2018, The Astrophysical Journal Supplement Series, 236, 43
1. *Improving initial conditions for cosmological N-body simulations*, **Garrison, L. H.**, Eisenstein, D. J., Ferrer, D., Metchnik, M. V., & Pinto,

P. A. 2016, Monthly Notices of the Royal Astronomical Society, 461, 4125

Contributing Author Publications

9. *Testing dark matter halo properties using self-similarity*, Leroy, M., **Garrison, L. H.**, Eisenstein, D., Joyce, M., & Maleubre, S. 2021, Monthly Notices of the Royal Astronomical Society, 501, 5064
8. *Quantifying resolution in cosmological N-body simulations using self-similarity*, Joyce, M., **Garrison, L. H.**, & Eisenstein, D. 2021, Monthly Notices of the Royal Astronomical Society, 501, 5051
7. *corrfunc–a suite of blazing fast correlation functions on the CPU*, Sinha, M., & **Garrison, L. H.** 2020, Monthly Notices of the Royal Astronomical Society, 491, 3022
6. *Cosmology with galaxy–galaxy lensing on non-perturbative scales: emulation method and application to BOSS LOWZ*, Wibking, B. D., Weinberg, D. H., Salcedo, A. N., et al. 2020, Monthly Notices of the Royal Astronomical Society, 492, 2872
5. *Emulating galaxy clustering and galaxy–galaxy lensing into the deeply non-linear regime: methodology, information, and forecasts*, Wibking, B. D., Salcedo, A. N., Weinberg, D. H., et al. 2019, Monthly Notices of the Royal Astronomical Society, 484, 989
4. *A Hybrid Deep Learning Approach to Cosmological Constraints From Galaxy Redshift Surveys*, Ntampaka, M., Eisenstein, D. J., Yuan, S., & **Garrison, L. H.** 2019, arXiv preprint arXiv:1909.10527
3. *Testing the Detection Significance on the Large-scale Structure by a JWST Deep Field Survey*, Zhang, H., Eisenstein, D. J., **Garrison, L. H.**, & Ferrer, D. W. 2019, The Astrophysical Journal, 875, 132
2. *Exploring the squeezed three-point galaxy correlation function with generalized halo occupation distribution models*, Yuan, S., Eisenstein, D. J., & **Garrison, L. H.** 2018, Monthly Notices of the Royal Astronomical Society, 478, 2019
1. *Using galaxy pairs to investigate the three-point correlation function in the squeezed limit*, Yuan, S., Eisenstein, D. J., & **Garrison, L. H.** 2017, Monthly Notices of the Royal Astronomical Society, 472, 577

Professional Service

Referee, MNRAS & ApJ — since 2016

Graduate Student Representative, CfA Library Committee — 2017–2019

Outreach

Mentor, CUNY Hackathon — Jan. 2021

- Supported hackathon teams at the City University of New York

Comedian, Science Riot — July 2020

- Wrote and delivered a short stand-up comedy routine about N-body cosmology

Observer, Harvard Observing Project 2014–2019
- Teaching undergrads how to make scientific measurements on a telescope

Volunteer, Cambridge Explores the Universe Summers 2015–2018

BiteScis Lesson Plan: Shooting for the Stars March 2018
- Created an open-access high school physics lesson plan based on Breakthrough Starshot

SAO Latino Initiative, Guest Instructor Summers 2017 - 2019

Banneker & Aztlán Institute, Tutor Summer 2017

Teaching

Teaching Fellow
- PHYS P-17010 *Introduction to Cosmology* Summer 2017
- AST S-35 *Fundamentals of Contemporary Astro.* Summer 2015
- CS 109 *Data Science* Fall 2013

Lecturer, Wolbach Library at the Harvard-Smithsonian CfA 2017
- Lecture series on modern Python for astronomy, beginner to expert level