

# LEHMAN H. GARRISON

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

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EMPLOYMENT	<b>Flatiron Research Fellow</b> Cosmology X Data Science Group Center for Computational Astrophysics Flatiron Institute, New York, NY	2019–present
EDUCATION	<b>Ph.D., Astronomy and Astrophysics</b> <i>Harvard University</i> , Cambridge, MA Thesis: <i>Computational Modeling of Large-Scale Structure with Abacus</i> Advisor: Daniel J. Eisenstein	2013–2019
	<b>B.A., Astrophysical Sciences</b> (High Honors) <i>Princeton University</i> , Princeton, NJ Thesis: <i>Galactic Warp Excitation by the Magellanic Clouds</i> Advisors: David N. Spergel, Naoki Yoshida (U. Tokyo)	2009–2013
AWARDS AND HONORS	<b>Eric Keto Prize</b> Best Ph.D. Thesis in Theoretical Astrophysics at Harvard University	April 2019
	<b>Smith Family Graduate Science and Engineering Fellowship</b> <i>Harvard University</i>	2013
	<b>Sigma Xi Book Award</b> Best Senior Thesis in Astronomy at Princeton University	June 2013
PROFESSIONAL SERVICE	<i>Co-chair</i> , DESI Cosmological Simulations Working Group <i>Referee</i> , MNRAS & ApJ <i>Graduate Student Representative</i> , CfA Library Committee	Oct. 2020– since 2016 2017–2019
SELECTED PUBLICATIONS	<b>First Author Publications</b> 8. <i>Self-Similarity of <math>k</math>-Nearest Neighbor Distributions in Scale-Free Simulations</i> , <b>Garrison, L. H.</b> , Abel, T., & Eisenstein, D. J. 2021a, submitted 7. <i>The ABACUS Cosmological <math>N</math>-body Code</i> , <b>Garrison, L. H.</b> , Eisenstein, D., Ferrer, D., Maksimova, N., & Pinto, P. 2021b, accepted 6. <i>Good and Proper: Self-Similarity of <math>N</math>-body Simulations with Proper Force Softening</i> , <b>Garrison, L. H.</b> , Joyce, M., & Eisenstein, D. J. 2021, MNRAS 5. <i>Checkpointing with cp: the POSIX Shared Memory System</i> , <b>Garrison, L. H.</b> , Eisenstein, D., & Maksimova, N. 2021, NERSC First International Symposium on Checkpointing for Supercomputing	

4. *Generating Approximate Halo Catalogues for Blind Challenges in Precision Cosmology*, **Garrison, L. H.**, & Eisenstein, D. J. 2019, MNRAS, 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, MNRAS, 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, MNRAS, 461, 4125

#### Contributing Author Publications

14. *Accuracy of power spectrum measurements in dissipationless cosmological simulations*, Maleubre, S., Eisenstein, D., **Garrison, L. H.**, & Joyce, M. 2021, arXiv e-prints
13. *ABACUSSUMMIT: A Massive Set of High-Accuracy, High-Resolution N-Body Simulations*, Maksimova, N., **Garrison, L. H.**, Eisenstein, D., et al. 2021, accepted
12. *COMPASO: A new halo finder for competitive assignment to spherical overdensities*, Hadzhiyska, B., Eisenstein, D., Bose, S., **Garrison, L. H.**, & Maksimova, N. 2021, submitted
11. *Constructing high-fidelity halo merger trees in ABACUSSUMMIT*, Bose, S., Eisenstein, D., Hadzhiyska, B., et al. 2021, submitted
10. *Testing Dark Matter Halo Properties Using Self-Similarity*, Leroy, M., **Garrison, L. H.**, Eisenstein, D., Joyce, M., & Maleubre, S. 2021, MNRAS, 501, 5064
9. *Quantifying Resolution in Cosmological N-body Simulations Using Self-Similarity*, Joyce, M., **Garrison, L. H.**, & Eisenstein, D. 2021, MNRAS, 501, 5051
8. *corrfunc—a Suite of Blazing Fast Correlation Functions on the CPU*, Sinha, M., & **Garrison, L. H.** 2020, MNRAS, 491, 3022
7. *Corrfunc: Blazing Fast Correlation Functions with AVX512FSIMD Intrinsics*, Sinha, M., & **Garrison, L. H.** 2018, Workshop on Software Challenges to Exascale Computing, 3
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, MNRAS, 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, MNRAS, 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, *MNRAS*, 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, *MNRAS*, 472, 577

OUTREACH	<i>Mentor</i> , CUNY Hackathon	Jan. 2021
	– Supported weekend hackathon teams at the City University of New York	
	<i>Comedian</i> , Science Riot/New York Academy of Sciences	July 2020
	– Wrote and delivered a short stand-up comedy routine about $N$ -body cosmology	
	<i>Observer</i> , Harvard Observing Project	2014–2019
	– Taught undergrads and community members how to make scientific measurements on a telescope (approx. a dozen annual sessions)	
	<i>Volunteer</i> , Cambridge Explores the Universe	Summers 2015–2018
	– Ran CfA outreach activities at the Cambridge Science Festival	
	<i>Author</i> , BiteScis Lesson Plan: Shooting for the Stars	March 2018
	– Created an open-access high school physics lesson plan based on Breakthrough Starshot	
TEACHING	<i>Guest Instructor</i> , SAO Latino Initiative	Summers 2017 – 2019
	– Lectured and tutored on introductory Python	
	<i>Tutor</i> , Banneker & Aztlán Institute	Summer 2017
	– Tutored on introductory Python and physics	
	<i>Organizer</i> , SciWare	2020–
	– Co-organized and taught Flatiron-internal workshops on scientific software best practices	
	<i>Instructor</i> , Software Carpentry	since Spring 2021
	– Certified instructor for Software Carpentry, a scientific software pedagogy program	
	<i>Teaching Fellow</i>	
	– PHYS P-17010 <i>Introduction to Cosmology</i>	Summer 2017
	– AST S-35 <i>Fundamentals of Contemporary Astro.</i>	Summer 2015
	– CS 109 <i>Data Science</i>	Fall 2013
	<i>Lecturer</i> , Wolbach Library at the Harvard-Smithsonian CfA	2017

- Lecture series on modern Python for astronomy, beginner to expert level