James Colin Hill

Curriculum Vitae

Current Address	538 W. 120th St. Pupin Hall MC 5221 Department of Physics Columbia University New York, NY 10027 USA
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Citizenship	USA Canada

Research Interests Cosmological Theory and Data Analysis: Cosmic Microwave Background; Large-Scale Structure; Galaxy Clusters; Sunyaev-Zel'dovich Effect; Gravitational Lensing; Cosmological Probes of Fundamental Physics

Education

Princeton University 2009 - 2014
Princeton, NJ
Ph.D. (2014), M.A. (2011), Astrophysical Sciences
Thesis: *Constraints on Cosmology and the Physics of the Intracluster Medium from Secondary Anisotropies in the Cosmic Microwave Background*
Thesis Advisor: David N. Spergel

University of Cambridge 2008 - 2009
Cambridge, UK
M.ASt. / Certificate of Advanced Study in Mathematics with Distinction (2009)
Advisors: Anthony Challinor, Paul Shellard

Massachusetts Institute of Technology (MIT) 2004 - 2008
Cambridge, MA
S.B. Physics, S.B. Mathematics (2008)
Thesis: *Cosmological Constraints from the Virial Mass Function of Nearby Galaxy Groups and Clusters*
Thesis Advisors: Claude Canizares, Kenneth Rines (CfA)

Positions Held	**Assistant Professor, Department of Physics** Columbia University, New York, NY	2019 - Present
	Associate Research Scientist, Center for Computational Astrophysics (CCA) Flatiron Institute, Simons Foundation, New York, NY	2019 - 2022
	Member, Institute for Advanced Study (IAS) **Flatiron Fellow, CCA** Joint postdoctoral fellowship IAS, Princeton, NJ Flatiron Institute, Simons Foundation, New York, NY	2017 - 2019
	Consultant, CCA Flatiron Institute, Simons Foundation, New York, NY	Summer 2017
	Junior Fellow, Simons Society of Fellows Columbia University, New York, NY Faculty Contact: Zoltán Haiman Postdoctoral fellowship funded by the Simons Foundation	2014 - 2017
	Harvard-Smithsonian Center for Astrophysics (CfA) Cambridge, MA Advisor: Kenneth Rines NSF REU summer intern	2007 - 2008
	MIT Cambridge, MA Advisor: Max Tegmark Research assistant in cosmology at MIT Kavli Institute for Astrophysics & Space Research (MKI)	2006 - 2007
	MIT Cambridge, MA Advisor: Scott Hughes Summer research assistant in gravitational wave analysis at MKI	2005

Awards	Buchalter Cosmology Prize (First Prize)	2023
	Sloan Research Fellow	2022
	Enseignant Chercheur Invité (Université Paris Diderot)	March 2016
	Junior Fellow, Simons Society of Fellows	2014-17
	R.A. Watchman Prize for Part III Mathematics	2009
	Foundation Scholarship (Jesus College, Cambridge)	2009
	NSF Graduate Research Fellowship	2008-11
	Barrett Award for Research in Astrophysics (MIT)	2008
	Orloff Award for Service in Physics (MIT)	2008

Phi Beta Kappa	2008
Sigma Pi Sigma	2008
Rhodes Scholarship Finalist	2007
Paul E. Gray UROP Researcher (MIT)	2005
United States Presidential Scholar	2004
National Merit Scholar	2004-8
Robert C. Byrd Honors Scholar	2004

Current Grants

DOE HEP DE-SC0011941 (Co-I; Awarded 8/28/23; Columbia High-Energy Theory Group Umbrella Grant): "Research in Theoretical High Energy Physics"

NSF AST-2307727 (Co-I; Awarded 7/27/23; Award: $603,824): "Precision Cosmology and Astrophysics with CMB Secondaries"

NSF MSRI-2 (Co-Project Scientist; Awarded 5/15/23; Award: $52.65M; CU Sub-Award: $156,083): "Mid-Scale RI-2: Advanced Millimeter Survey Instrumentation in Chile"

NASA 80NSSC23K0463 [ADAP] (PI; Awarded 10/5/22; Award: $460,835): "Using Neural Networks to Maximize Cosmological Information Extraction from *Planck* Maps of the Thermal Sunyaev-Zel'dovich Effect"

NASA 80NSSC22K0721 [ATP] (Co-I; Awarded 11/3/21; Award: $309,642): "A novel approach to maximize the astrophysical and cosmological information extracted from thermal Sunyaev-Zel'dovich maps"

NSF AST-2108536 (PI; Awarded 8/27/21; Award: $483,459): "Illuminating Galaxy Formation with the Atacama Cosmology Telescope"

Previous Grants

DOE HEP DE-SC00233966 (PI; Awarded 9/20/22; Award: $40,000): "Uncovering New Physics in the Cosmic Microwave Background: Developing Novel Theoretical Models and Machine-Learning-Powered Constraints"

Columbia University Lenfest Junior Faculty Development Grant (PI; Awarded 7/10/20): "Sweeping Away Cosmic Dust with the Atacama Cosmology Telescope"

Jet Propulsion Laboratory Strategic Research & Technical Development Program Grant (Co-I; Awarded 9/27/18; Award: $262,000): "Mapping the Baryonic Majority: Comprehensive Multi-Mission Analysis of the Circumgalactic Medium and the Intergalactic Medium"

NASA 17-ATP17-0048 (Collaborator; Awarded 2/2/18; Award: $614,196):

"Realizing the Full Potential of Weak Lensing Cosmology"

NSF AST-1311756 (Collaborator; Awarded 9/9/13; Award: $539,488): "Combining Thermal SZ and Gravitational Lensing Measurements: A Novel Approach to Measuring the Amplitude of Matter Fluctuations"

PUBLICATIONS (* INDICATES A STUDENT PROJECT FOR WHICH I WAS THE PRIMARY SUPERVISOR)

First- or second-author papers:

1. E. McDonough, **J. C. Hill**, M. M. Ivanov, A. La Posta, and M. W. Toomey. "Observational Constraints on Early Dark Energy" (2023). *Int. Journal of Modern Physics D* invited review, `arXiv:2310.19899 [astro-ph.CO]`.
2. F. McCarthy and **J. C. Hill**. "Cross-correlation of the thermal Sunyaev–Zel'dovich and CMB lensing signals in *Planck* PR4 data with robust CIB decontamination" (2024). *Phys. Rev. D*, 109, 023529, `arXiv:2308.16260 [astro-ph.CO]`.
3. F. McCarthy and **J. C. Hill**. "Component-separated, CIB-cleaned thermal Sunyaev–Zel'dovich maps from *Planck* PR4 data with a flexible public needlet ILC pipeline" (2024). *Phys. Rev. D*, 109, 023528, `arXiv:2307.01043 [astro-ph.CO]`.
4. **J. C. Hill** and B. Bolliet. "Did the Universe Reheat After Recombination?" (2023). *Phys. Rev. D* submitted, `arXiv:2304.03750 [astro-ph.CO]`.
5. * S. Goldstein, **J. C. Hill**, V. Irsic, and B. D. Sherwin. "Canonical Hubble-Tension-Resolving Early Dark Energy Cosmologies are Inconsistent with the Lyman-α Forest" (2023). *Phys. Rev. Lett.*, 131, 201001, `arXiv:2303.00746 [astro-ph.CO]`.
   —Highlighted as *Phys. Rev. Lett.* Editors' Suggestion
6. F. McCarthy and **J. C. Hill**. "Converting dark matter to dark radiation does not solve cosmological tensions" (2023). *Phys. Rev. D*, 108, 063501, `arXiv:2210.14339 [astro-ph.CO]`.
7. B. Bolliet, **J. C. Hill**, S. Ferraro, A. Kusiak, and A. Krolewski. "Projected-Field Kinetic Sunyaev-Zel'dovich Cross-Correlations: Halo Model and Forecasts" (2023). *JCAP*, 03, 039, `arXiv:2208.07847 [astro-ph.CO]`.
8. * A. Sabyr, **J. C. Hill**, and B. Bolliet. "Inverse-Compton Scattering of the Cosmic Infrared Background" (2022). *Phys. Rev. D*, 106, 023529, `arXiv:2202.02275 [astro-ph.CO]`.
9. **J. C. Hill**, E. Calabrese, et al. "The Atacama Cosmology Telescope: Constraints on Pre-Recombination Early Dark Energy" (2022). *Phys. Rev. D*, 105, 123536, `arXiv:2109.04451 [astro-ph.CO]`.

10. * F. McCarthy, **J. C. Hill**, and M. S. Madhavacheril. "Baryonic feedback biases on fundamental physics from lensed CMB power spectra" (2022). *Phys. Rev. D*, 105, 023517, `arXiv:2103.05582 [astro-ph.CO]`.
11. * L. Thiele, **J. C. Hill**, and K. M. Smith. "Accurate Analytic Model for the Weak Lensing Convergence One-Point Probability Distribution Function and its Auto-Covariance" (2020). *Phys. Rev. D*, 102, 123545, `arXiv:2009.06547 [astro-ph.CO]`.
12. **J. C. Hill**, E. McDonough, M. W. Toomey, and S. Alexander. "Early Dark Energy Does Not Restore Cosmological Concordance" (2020). *Phys. Rev. D*, 102, 043507, `arXiv:2003.07355 [astro-ph.CO]`.
    —Highlighted as *Phys. Rev. D* Editors' Suggestion
13. M. S. Madhavacheril, **J. C. Hill**, S. Naess, et al. "The Atacama Cosmology Telescope: Component-separated maps of CMB temperature and the thermal Sunyaev-Zel'dovich effect" (2020). *Phys. Rev. D*, 102, 023534, `arXiv:1911.05717 [astro-ph.CO]`.
14. M. H. Abitbol, **J. C. Hill**, and J. Chluba. "Measuring the Hubble constant from the cooling of the CMB monopole" (2020). *ApJ*, 893, 1, `arXiv:1910.09881 [astro-ph.CO]`.
15. * L. Thiele, **J. C. Hill**, and K. M. Smith. "An Accurate Analytic Model for the Thermal Sunyaev-Zel'dovich One-Point PDF" (2019). *Phys. Rev. D*, 99, 103511, `arXiv:1812.05584 [astro-ph.CO]`.
16. **J. C. Hill**. "Foreground Biases on Primordial Non-Gaussianity Measurements from the CMB Temperature Bispectrum: Implications for *Planck* and Beyond" (2018). *Phys. Rev. D*, 98, 083542, `arXiv:1807.07324 [astro-ph.CO]`.
17. **J. C. Hill** and E. J. Baxter. "Can Early Dark Energy Explain EDGES?" (2018). *JCAP*, 08, 037, `arXiv:1803.07555 [astro-ph.CO]`.
18. M. S. Madhavacheril and **J. C. Hill**. "Mitigating Foreground Biases in CMB Lensing Reconstruction Using Cleaned Gradients" (2018). *Phys. Rev. D*, 98, 023534, `arXiv:1802.08230 [astro-ph.CO]`.
19. D. Alonso, **J. C. Hill**, R. Hložek, and D. N. Spergel. "Measurement of the thermal Sunyaev-Zel'dovich effect around cosmic voids" (2018). *Phys. Rev. D*, 97, 063514, `arXiv:1709.01489 [astro-ph.CO]`.
    —Highlighted as *Phys. Rev. D* Editors' Suggestion
20. **J. C. Hill**, E. J. Baxter, A. Lidz, J. P. Greco, and B. Jain. "The Two-Halo Term in Stacked Thermal Sunyaev-Zel'dovich Measurements: Implications for Self-Similarity" (2018). *Phys. Rev. D*, 97, 083501, `arXiv:1706.03753 [astro-ph.CO]`.
21. S. Ferraro and **J. C. Hill**. "Bias to CMB Lensing Reconstruction from Temperature Anisotropies due to Large-Scale Galaxy Motions" (2018). *Phys. Rev. D*, 97, 023512, `arXiv:1705.06751 [astro-ph.CO]`.

22. * B. Yu, **J. C. Hill**, and B. D. Sherwin. "Multi-tracer CMB delensing maps from *Planck* and *WISE* data" (2017). *Phys. Rev. D*, 96, 123511, `arXiv:1705.02332 [astro-ph.CO]`.
23. J. Chluba, **J. C. Hill**, and M. H. Abitbol. "Rethinking CMB foregrounds: systematic extension of foreground parameterizations" (2017). *MNRAS*, 472, 1195, `arXiv:1701.00274 [astro-ph.CO]`.
24. * J. Liu, **J. C. Hill**, B. D. Sherwin, A. Petri, V. Böhm, and Z. Haiman. "CMB Lensing Beyond the Power Spectrum: Cosmological Constraints from the One-Point PDF and Peak Counts" (2016). *Phys. Rev. D*, 94, 103501, `arXiv:1608.03169 [astro-ph.CO]`.
25. S. Ferraro, **J. C. Hill**, N. Battaglia, J. Liu, and D. N. Spergel. "The Kinematic Sunyaev-Zel'dovich Effect with Projected Fields II: Prospects, Challenges, and Comparison with Simulations" (2016). *Phys. Rev. D*, 94, 123526, `arXiv:1605.02722 [astro-ph.CO]`.
—Highlighted as *Phys. Rev. D* Editors' Suggestion
26. **J. C. Hill**, S. Ferraro, N. Battaglia, J. Liu, and D. N. Spergel. "The Kinematic Sunyaev-Zel'dovich Effect with Projected Fields: A Novel Probe of the Baryon Distribution with *Planck*, *WMAP*, and *WISE* Data" (2016). *Phys. Rev. Lett.*, 117, 051301, `arXiv:1603.01608 [astro-ph.CO]`.
27. * M. H. Abitbol, **J. C. Hill**, and B. R. Johnson. "Foreground-Induced Biases in CMB Polarimeter Self-Calibration" (2016). *MNRAS*, 457, 1796, `arXiv:1512.06834 [astro-ph.CO]`.
28. * S. E. Clark, **J. C. Hill**, J. E. G. Peek, M. E. Putman, and B. L. Babler. "Neutral hydrogen structures trace dust polarization angle: Implications for cosmic microwave background foregrounds" (2015). *Phys. Rev. Lett.*, 115, 241302, `arXiv:1508.07005 [astro-ph.CO]`.
—Highlighted as *Phys. Rev. Lett.* Editors' Suggestion
29. **J. C. Hill**, N. Battaglia, J. Chluba, S. Ferraro, E. Schaan, and D. N. Spergel. "Taking the Universe's Temperature with Spectral Distortions of the Cosmic Microwave Background" (2015). *Phys. Rev. Lett.*, 115, 261301, `arXiv:1507.01583 [astro-ph.CO]`.
30. * J. Liu and **J. C. Hill**. "Cross-Correlation of Planck CMB Lensing and CFHTLenS Galaxy Weak Lensing Maps" (2015). *Phys. Rev. D*, 92, 063517, `arXiv:1504.05598 [astro-ph.CO]`.
31. N. Battaglia, **J. C. Hill**, and N. Murray. "Deconstructing Thermal Sunyaev-Zel'dovich – Gravitational Lensing Cross-Correlations: Implications for the Intracluster Medium" (2015). *ApJ*, 812, 154, `arXiv:1412.5593 [astro-ph.CO]`.
32. **J. C. Hill**, B. D. Sherwin, K. M. Smith, et al. "The Atacama Cosmology Telescope: A Measurement of the Thermal Sunyaev-Zel'dovich

One-Point Probability Distribution Function" (2014). arXiv:1411.8004 [astro-ph.CO].

33. * J. P. Greco, **J. C. Hill**, D. N. Spergel, and N. Battaglia. "The Stacked Thermal Sunyaev-Zel'dovich Signal of Locally Brightest Galaxies in Planck Full Mission Data: Evidence for Galaxy Feedback?" (2015). *ApJ*, 808, 151, arXiv:1409.6747 [astro-ph.CO].
34. R. Flauger, **J. C. Hill**, and D. N. Spergel. "Toward an Understanding of Foreground Emission in the BICEP2 Region" (2014). *JCAP*, 08, 039, arXiv:1405.7351 [astro-ph.CO].
35. **J. C. Hill** and D. N. Spergel. "Detection of Thermal SZ – CMB Lensing Cross-Correlation in Planck Nominal Mission Data" (2014). *JCAP*, 02, 030, arXiv:1312.4525 [astro-ph.CO].
36. **J. C. Hill** and E. Pajer. "Cosmology from the Thermal Sunyaev-Zel'dovich Power Spectrum: Primordial non-Gaussianity and Massive Neutrinos" (2013). *Phys. Rev. D*, 88, 063526, arXiv:1303.4726 [astro-ph.CO].
37. **J. C. Hill** and B. D. Sherwin. "Cosmological Constraints from Moments of the Thermal Sunyaev-Zel'dovich Effect" (2013). *Phys. Rev. D*, 87, 023527, arXiv:1205.5794 [astro-ph.CO].

Co-led papers with significant contribution/supervision:

1. A. Laguë, F. McCarthy, M. Madhavacheril, **J. C. Hill**, and F. J. Qu. "Constraints on Dark Matter-Dark Energy Scattering from ACT DR6 CMB Lensing" (2024). *Phys. Rev. D* submitted, arXiv:2402.08149 [astro-ph.CO].
2. S. Pandey, J. Salcido, C.-H. To, **J. C. Hill**, D. Anbajagane, E. J. Baxter, and I. G. McCarthy. "GODMAX: Modeling gas thermodynamics and matter distribution using JAX" (2024). *MNRAS* submitted, arXiv:2401.18072 [astro-ph.CO].
3. * S. Goldstein, O. H. E. Philcox, **J. C. Hill**, A. Esposito, and L. Hui. "Consistently constraining $f_{\rm NL}$ with the squeezed lensing bispectrum using consistency relations" (2024). *Phys. Rev. D*, 109, 043515, arXiv:2310.12959 [astro-ph.CO].
4. W. Coulton, M. Madhavacheril, A. Duivenvoorden, **J. C. Hill**, et al. "The Atacama Cosmology Telescope: High-resolution component-separated maps across one-third of the sky" (2023). *Phys. Rev. D* in press, arXiv:2307.01258 [astro-ph.CO].
5. * M. Mallaby-Kay, S. Amodeo, **J. C. Hill**, et al. "The Kinematic Sunyaev-Zel'dovich Effect with ACT, DES, and BOSS: a Novel Hybrid Estimator" (2023). *Phys. Rev. D*, 108, 023516, arXiv:2305.06792 [astro-ph.CO].

6. * A. Kusiak, K. M. Surrao, and **J. C. Hill**. "Enhancing Measurements of the CMB Blackbody Temperature Power Spectrum by Removing CIB and Thermal Sunyaev-Zel'dovich Contamination Using External Galaxy Catalogs" (2023). *Phys. Rev. D*, 108, 123501, `arXiv:2303.08121 [astro-ph.CO]`.
7. B. Bolliet, A. Spurio Mancini, **J. C. Hill**, M. Madhavacheril, et al. "High-accuracy emulators for observables in ΛCDM, $N_{\rm eff}$, $\sum m_\nu$, and w cosmologies" (2023). *MNRAS* submitted, `arXiv:2303.01591 [astro-ph.CO]`.
8. * K. M. Surrao, O. H. E. Philcox, and **J. C. Hill**. "ReMASTERed: Accurate Estimation of Angular Power Spectra for Maps with Correlated Masks" (2023). *Phys. Rev. D*, 107, 083521, `arXiv:2302.05436 [astro-ph.CO]`.
9. M.-X. Lin, E. McDonough, **J. C. Hill**, and W. Hu. "A Dark Matter Trigger for Early Dark Energy Coincidence" (2023). *Phys. Rev. D*, 107, 103523, `arXiv:2212.08098 [astro-ph.CO]`.
10. * S. Goldstein, A. Esposito, O. H. E. Philcox, L. Hui, **J. C. Hill**, R. Scoccimarro, and M. H. Abitbol. "Squeezing $f_{\rm NL}$ out of the matter bispectrum with consistency relations" (2022). *Phys. Rev. D*, 106, 123525, `arXiv:2209.06228 [astro-ph.CO]`.
    —Awarded First Prize in Buchalter Cosmology Prize Competition (January 2023)
11. D. Wadekar, L. Thiele, **J. C. Hill**, S. Pandey, F. Villaescusa-Navarro, et al. "The SZ flux–mass (Y-M) relation at low halo masses: improvements with symbolic regression and strong constraints on baryonic feedback" (2023). *MNRAS*, 522, 2628, `arXiv:2209.02075 [astro-ph.CO]`.
12. * A. Kusiak, B. Bolliet, A. Krolewski, and **J. C. Hill**. "Constraining the galaxy-halo connection of infrared-selected *unWISE* galaxies with galaxy clustering and galaxy-CMB lensing power spectra" (2022). *Phys. Rev. D*, 106, 123517, `arXiv:2203.12583 [astro-ph.CO]`.
13. * L. Thiele, D. Wadekar, **J. C. Hill**, N. Battaglia, J. Chluba, et al. "Percent-level constraints on baryonic feedback with spectral distortion measurements" (2022). *Phys. Rev. D*, 105, 083505, `arXiv:2201.01663 [astro-ph.CO]`.
14. D. Wadekar, L. Thiele, F. Villaescusa-Navarro, **J. C. Hill**, M. Cranmer, et al. "Augmenting astrophysical scaling relations with machine learning: application to reducing the SZ flux-mass scatter" (2023). *PNAS*, 120 (12) e2202074120, `arXiv:2201.01305 [astro-ph.CO]`.
15. A. La Posta, T. Louis, X. Garrido, and **J. C. Hill**. "Constraints on Pre-Recombination Early Dark Energy from SPT-3G Public Data" (2021). *Phys. Rev. D*, 105, 083519, `arXiv:2112.10754 [astro-ph.CO]`.

16. E. McDonough, M.-X. Lin, **J. C. Hill**, W. Hu, and S. Zhou. "The Early Dark Sector, the Hubble Tension, and the Swampland" (2021). *Phys. Rev. D*, 106, 043525, `arXiv:2112.09128 [astro-ph.CO]`.
—Highlighted as *Phys. Rev. D* Editors' Suggestion
17. * H. Cai, M. Madhavacheril, **J. C. Hill**, and A. Kosowsky. "The Bias to Cosmic Microwave Background Lensing Reconstruction from the Kinematic Sunyaev-Zel'dovich Effect at Reionization" (2022). *Phys. Rev. D*, 105, 043516, `arXiv:2111.01944 [astro-ph.CO]`.
18. S. Pandey, M. Gatti, E. Baxter, **J. C. Hill**, et al. "Cross-correlation of DES Y3 lensing and ACT/Planck thermal Sunyaev Zel'dovich Effect II: Modeling and constraints on halo pressure profiles" (2022). *Phys. Rev. D*, 105, 123526, `arXiv:2108.01601 [astro-ph.CO]`.
19. M. Gatti, S. Pandey, E. Baxter, **J. C. Hill**, et al. "Cross-correlation of DES Y3 lensing and ACT/Planck thermal Sunyaev Zel'dovich Effect I: Measurements, systematics tests, and feedback model constraints" (2022). *Phys. Rev. D*, 105, 123525, `arXiv:2108.01600 [astro-ph.CO]`.
20. * L. Thiele, Y. Guan, **J. C. Hill**, A. Kosowsky, and D. N. Spergel. "Can small-scale baryon inhomogeneities resolve the Hubble tension? An investigation with ACT DR4" (2021). *Phys. Rev. D*, 104, 063535, `arXiv:2105.03003 [astro-ph.CO]`.
21. S. E. Clark, C.-G. Kim, **J. C. Hill**, and B. S. Hensley. "The Origin of Parity Violation in Polarized Dust Emission and Implications for Cosmic Birefringence" (2021). *ApJ*, 919, 53, `arXiv:2105.00120 [astro-ph.GA]`.
22. * A. Kusiak, B. Bolliet, S. Ferraro, **J. C. Hill**, and A. Krolewski. "Constraining the Baryon Abundance with the Kinematic Sunyaev-Zel'dovich Effect: Projected-Field Detection Using Planck, WMAP, and unWISE" (2021). *Phys. Rev. D*, 104, 043518, `arXiv:2102.01068 [astro-ph.CO]`.
23. * Y. S. Abylkairov, O. Darwish, **J. C. Hill**, and B. D. Sherwin. "Partially Constrained Internal Linear Combination: a method for low-noise CMB foreground mitigation" (2021). *Phys. Rev. D*, 103, 103510, `arXiv:2012.04032 [astro-ph.CO]`.
24. M. M. Ivanov, E. McDonough, **J. C. Hill**, M. Simonovic, M. W. Toomey, S. Alexander, and M. Zaldarriaga. "Constraining Early Dark Energy with Large-Scale Structure" (2020). *Phys. Rev. D*, 102, 103502, `arXiv:2006.11235 [astro-ph.CO]`.
25. M. A. Alvarez, S. Ferraro, **J. C. Hill**, R. Hlozek, and M. Ikape. "Mitigating the optical depth degeneracy using the kinematic Sunyaev-Zel'dovich effect with CMB-S4" (2021). *Phys. Rev. D*, 103, 063518, `arXiv:2006.06594 [astro-ph.CO]`.

26. * S. Pandey, E. J. Baxter, and **J. C. Hill**. "Constraining the properties of gaseous halos via cross-correlations of upcoming galaxy surveys and thermal Sunyaev-Zel'dovich maps" (2020). *Phys. Rev. D*, 101, 043525, `arXiv:1909.00405 [astro-ph.CO]`.
27. The Simons Observatory Collaboration: P. Ade, . . . , **J. C. Hill**, et al. "The Simons Observatory: Science Goals and Forecasts" (2019). *JCAP*, 02, 056, `arXiv:1808.07445 [astro-ph.CO]`.
28. * M. H. Abitbol, J. Chluba, **J. C. Hill**, and B. R. Johnson. "Prospects for Measuring Cosmic Microwave Background Spectral Distortions in the Presence of Foregrounds" (2017). *MNRAS*, 471, 1126, `arXiv:1705.01534 [astro-ph.CO]`.
29. * J. Liu, A. Ortiz-Vazquez, and **J. C. Hill**. "Constraining Multiplicative Bias in CFHTLenS Weak Lensing Shear Data" (2016). *Phys. Rev. D*, 93, 103508, `arXiv:1601.05720 [astro-ph.CO]`.
30. M. J. Wilson, B. D. Sherwin, **J. C. Hill**, et al. "The Atacama Cosmology Telescope: A Measurement of the Thermal Sunyaev-Zel'dovich Effect Using the Skewness of the CMB Temperature Distribution," (2012). *Phys. Rev. D*, 86, 122005, `arXiv:1203.6633 [astro-ph.CO]`.
31. M. E. C. Swanson, M. Tegmark, A. J. S. Hamilton, and **J. C. Hill**. "Methods for Rapidly Processing Angular Masks of Next-Generation Galaxy Surveys" (2008). *MNRAS*, 387, 1391, `arXiv:0711.4352 [astro-ph]`.

Other co-authored papers:

1. W. R. Coulton, et al. "The Atacama Cosmology Telescope: Detection of Patchy Screening of the Cosmic Microwave Background" (2024). *Science* submitted, `arXiv:2401.13033 [astro-ph.CO]`.
2. D. Anbajagane, et al. "Cosmological shocks around galaxy clusters: A coherent investigation with DES, SPT & ACT" (2023). *MNRAS* submitted, `arXiv:2310.00059 [astro-ph.GA]`.
3. G. S. Farren, et al. "The Atacama Cosmology Telescope: Cosmology from cross-correlations of unWISE galaxies and ACT DR6 CMB lensing" (2023). *ApJ* submitted, `arXiv:2309.05659 [astro-ph.CO]`.
4. S. Shaikh, et al. "Cosmology from Cross-Correlation of ACT-DR4 CMB Lensing and DES-Y3 Cosmic Shear" (2024). *MNRAS*, 528, 2112, `arXiv:2309.04412 [astro-ph.CO]`.
5. B. Cyr, T. Kite, J. Chluba, **J. C. Hill**, D. Jeong, S. K. Acharya, B. Bolliet, S. P. Patil. "Disentangling the primordial nature of stochastic gravitational wave backgrounds with CMB spectral distortions" (2024). *MNRAS*, 528, 883, `arXiv:2309.02366 [astro-ph.CO]`.

6. G. A. Marques, et al. "Cosmological constraints from the tomography of DES-Y3 galaxies with CMB lensing from ACT DR4" (2024). *JCAP*, 01, 033, `arXiv:2306.17268 [astro-ph.CO]`.
7. M. S. Madhavacheril, et al. "The Atacama Cosmology Telescope: DR6 Gravitational Lensing Map and Cosmological Parameters" (2023). *ApJ* in press, `arXiv:2304.05203 [astro-ph.CO]`.
8. F. J. Qu, et al. "The Atacama Cosmology Telescope: A Measurement of the DR6 CMB Lensing Power Spectrum and its Implications for Structure Growth" (2023). *ApJ* in press, `arXiv:2304.05202 [astro-ph.CO]`.
9. N. MacCrann, et al. "The Atacama Cosmology Telescope: Mitigating the impact of extragalactic foregrounds for the DR6 CMB lensing analysis" (2023). *ApJ* in press, `arXiv:2304.05196 [astro-ph.CO]`.
10. A. Kogut, et al. "Systematic error mitigation for the PIXIE Fourier transform spectrometer" (2023). *JCAP*, 07, 057, `arXiv:2304.00091 [astro-ph.CO]`.
11. J. Clancy, et al. "Polarization fraction of *Planck* Galactic cold clumps and forecasts for the Simons Observatory" (2023). *MNRAS*, 524, 3712, `arXiv:2303.02788 [astro-ph.GA]`.
12. D. Zegeye, et al. "CMB-S4: Forecasting Constraints on $f_{\rm NL}$ Through μ-distortion Anisotropy" (2023). *Phys. Rev. D*, 108, 103536, `arXiv:2303.00916 [astro-ph.CO]`.
13. R. Aurlien, et al. "Foreground Separation and Constraints on Primordial Gravitational Waves with the PICO Space Mission" (2023). *JCAP*, 06, 034, `arXiv:2211.14342 [astro-ph.CO]`.
14. C. D. Kreisch, et al. "The Atacama Cosmology Telescope: The Persistence of Neutrino Self-Interaction in Cosmological Measurements" (2024). *Phys. Rev. D*, 109, 043501, `arXiv:2207.03164 [astro-ph.CO]`.
15. R. An, V. Gluscevic, E. Calabrese, and **J. C. Hill**. "What does cosmology tell us about the mass of thermal-relic dark matter?" (2022). *JCAP*, 07, 002, `arXiv:2202.03515 [astro-ph.CO]`.
16. M. Lungu, et al. "The Atacama Cosmology Telescope: Measurement and Analysis of 1D Beams for DR4" (2021). *JCAP*, 05, 044, `arXiv:2112.12226 [astro-ph.IM]`.
17. J. Kim, et al. "Probing Hot Gas Components of Circumgalactic Medium in Cosmological Simulations with the Thermal Sunyaev-Zel'dovich Effect" (2022). *ApJ*, 926, 179, `arXiv:2110.15381 [astro-ph.GA]`.
18. M. Lokken, et al. "Superclustering with the Atacama Cosmology Telescope and Dark Energy Survey: I. Evidence for thermal energy anisotropy using oriented stacking" (2021). *ApJ*, 933, 134, `arXiv:2107.05523 [astro-ph.CO]`.

19. A. Hincks, et al. "A high-resolution view of the filament of gas between Abell 399 and Abell 401 from the Atacama Cosmology Telescope and MUSTANG-2" (2022). *MNRAS*, 510, 3335, `arXiv:2107.04611 [astro-ph.CO]`.
20. T. Shin, et al. "The mass and galaxy distribution around SZ-selected clusters" (2021). *MNRAS*, 507, 5758, `arXiv:2105.05914 [astro-ph.CO]`.
21. S. K. Naess, et al. "The Atacama Cosmology Telescope: A Search for Planet 9" (2021). *ApJ*, 923, 224, `arXiv:2104.10264 [astro-ph.EP]`.
22. M. Mallaby-Kay, et al. "The Atacama Cosmology Telescope: Summary of DR4 and DR5 Data Products and Data Access" (2021). *ApJS*, 255, 11, `arXiv:2103.03154 [astro-ph.CO]`.
23. V. Calafut, et al. "The Atacama Cosmology Telescope: Detection of the Pairwise Kinematic Sunyaev-Zel'dovich Effect with SDSS DR15 Galaxies" (2021). *Phys. Rev. D*, 104, 043502, `arXiv:2101.08374 [astro-ph.CO]`.
24. E. M. Vavagiakis, et al. "The Atacama Cosmology Telescope: Probing the Baryon Content of SDSS DR15 Galaxies with the Thermal and Kinematic Sunyaev-Zel'dovich Effects" (2021). *Phys. Rev. D*, 104, 043503, `arXiv:2101.08373 [astro-ph.CO]`.
25. S. K. Naess, et al. "The Atacama Cosmology Telescope: Detection of mm-wave transient sources" (2021). *ApJ*, 915, 14, `arXiv:2012.14347 [astro-ph.CO]`.
26. N. C. Robertson, et al. "Strong detection of the CMB lensing and galaxy weak lensing cross-correlation from ACT-DR4, Planck Legacy, and KiDS-1000" (2021). *A&A*, 649, A146, `arXiv:2011.11613 [astro-ph.CO]`.
27. M. H. Abitbol, et al. "The Simons Observatory: Bandpass and polarization-angle calibration requirements for B-mode searches" (2021). *JCAP*, 05, 032, `arXiv:2011.02449 [astro-ph.CO]`.
28. M. Hilton, et al. "The Atacama Cosmology Telescope: A Catalog of $>$ 4000 Sunyaev-Zel'dovich Galaxy Clusters" (2020). *ApJS*, 253, 3, `arXiv:2009.11043 [astro-ph.CO]`.
29. M. S. Madhavacheril, et al. "The Atacama Cosmology Telescope: Weighing distant clusters with the most ancient light" (2020). *ApJL*, 903, L13, `arXiv:2009.07772 [astro-ph.CO]`.
30. S. Amodeo, et al. "The Atacama Cosmology Telescope: Modelling the Gas Thermodynamics in BOSS CMASS galaxies from Kinematic and Thermal Sunyaev-Zel'dovich Measurements" (2020). *Phys. Rev. D*, 103, 063514, `arXiv:2009.05558 [astro-ph.CO]`.

31. E. Schaan, et al. "The Atacama Cosmology Telescope: Combined kinematic and thermal Sunyaev-Zel'dovich measurements from BOSS CMASS and LOWZ halos" (2020). *Phys. Rev. D*, 103, 063513, `arXiv:2009.05557 [astro-ph.CO]`.

32. The CMB-S4 Collaboration, et al. "CMB-S4: Forecasting Constraints on Primordial Gravitational Waves" (2020). *ApJ* in press, `arXiv:2008.12619 [astro-ph.CO]`.

33. S. Adhikari, et al. "Probing galaxy evolution in massive clusters using ACT and DES: splashback as a cosmic clock" (2020). *ApJ*, 923, 37, `arXiv:2008.11663 [astro-ph.CO]`.

34. G. A. Marques, J. Liu, K. M. Huffenberger, and **J. C. Hill**. "Cross-correlation between Subaru Hyper Suprime-Cam Galaxy Weak Lensing and Planck Cosmic Microwave Background Lensing" (2020). *ApJ*, 904, 182, `arXiv:2008.04369 [astro-ph.CO]`.

35. D. Han, et al. "The Atacama Cosmology Telescope: Delensed Power Spectra and Parameters" (2021). *JCAP*, 01, 031, `arXiv:2007.14405 [astro-ph.CO]`.

36. S. Aiola, et al. "The Atacama Cosmology Telescope: DR4 Maps and Cosmological Parameters" (2020). *JCAP*, 12, 047, `arXiv:2007.07288 [astro-ph.CO]`.

37. S. K. Choi, et al. "The Atacama Cosmology Telescope: A Measurement of the Cosmic Microwave Background Power Spectra at 98 and 150 GHz" (2020). *JCAP*, 12, 045, `arXiv:2007.07289 [astro-ph.CO]`.

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41. The CMB-S4 Collaboration: K. Abazajian, ..., **J. C. Hill**, et al. "CMB-S4 Science Case, Reference Design, and Project Plan" (2019). `arXiv:1907.04473 [astro-ph.CO]`.

42. B. Thorne, et al. "Removal of Galactic foregrounds for the Simons Observatory primordial gravitational wave search" (2019). *Phys. Rev. D* submitted, `arXiv:1905.08888 [astro-ph.CO]`.

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44. S. Hanany, et al. "PICO: Probe of Inflation and Cosmic Origins" (2019). *NASA Probe Class Mission Study*, `arXiv:1902.10541 [astro-ph.IM]`.

45. T. Shin, et al. "Measurement of the Splashback Feature around SZ-selected Galaxy Clusters with DES, SPT and ACT" (2019). *MNRAS*, 487, 2900, `arXiv:1811.06081 [astro-ph.CO]`.

46. V. Böhm, B. D. Sherwin, J. Liu, **J. C. Hill**, M. Schmittfull, and T. Namikawa. "On the effect of non-Gaussian lensing deflections on CMB lensing measurements" (2018). *Phys. Rev. D*, 98, 123510, `arXiv:1806.01157 [astro-ph.CO]`.

47. H. Miyatake, et al. "Weak-Lensing Mass Calibration of ACTPol Sunyaev-Zel'dovich Clusters with the Hyper Suprime-Cam Survey" (2019). *ApJ*, 875, 63, `arXiv:1804.05873 [astro-ph.CO]`.

48. J. Liu, S. Bird, J. M. Z. Matilla, **J. C. Hill**, Z. Haiman, M. S. Madhavacheril, A. Petri, and D. N. Spergel. "MassiveNuS: Cosmological Massive Neutrino Simulations" (2018). *JCAP*, 03, 049, `arXiv:1711.10524 [astro-ph.CO]`.

49. W. R. Coulton, et al. "Non-Gaussianity of Secondary Anisotropies from ACTPol and Planck" (2017). *JCAP*, 09, 022, `arXiv:1711.07879 [astro-ph.CO]`.

50. B. D. Sherwin, et al. "The Atacama Cosmology Telescope: Two-Season ACTPol Lensing Power Spectrum" (2017). *Phys. Rev. D*, 95, 123529, `arXiv:1611.09753 [astro-ph.CO]`.

51. K. N. Abazajian, et al. "CMB-S4 Science Book, First Edition" (2016). `arXiv:1610.02743 [astro-ph.CO]`.

52. T. Louis, et al. "The Atacama Cosmology Telescope: Two-Season ACTPol Spectra and Parameters" (2017). *JCAP*, 06, 031, `arXiv:1610.02360 [astro-ph.CO]`.

53. F. de Bernardis, et al. "Detection of the pairwise kinematic Sunyaev-Zel'dovich effect with BOSS DR11 and the Atacama Cosmology Telescope" (2017). *JCAP*, 03, 008, `arXiv:1607.02139 [astro-ph.CO]`.

54. E. Schaan, et al. "Evidence for the Kinematic Sunyaev-Zel'dovich Effect with ACTPol and Velocity Reconstruction from BOSS" (2016). *Phys. Rev. D*, 93, 082002, `arXiv:1510.06442 [astro-ph.CO]`.

55. D. Crichton, et al. "Evidence for the Thermal Sunyaev-Zel'dovich Effect Associated with Quasar Feedback" (2015). *MNRAS*, 458, 1478, `arXiv:1510.05656 [astro-ph.CO]`.

56. N. Battaglia, et al. "Weak-Lensing Mass Calibration of the Atacama Cosmology Telescope Equatorial Sunyaev-Zel'dovich Cluster Sample with the Canada-France-Hawaii Telescope Stripe 82 Survey" (2016). *JCAP*, 08, 013, `arXiv:1509.08930 [astro-ph.CO]`.

57. M. S. Madhavacheril, et al. "The Atacama Cosmology Telescope: Detection of Lensing of the Cosmic Microwave Background by Dark Matter Halos" (2015). *Phys. Rev. Lett.*, 114, 151302, `arXiv:1411.7999 [astro-ph.CO]`.

58. A. van Engelen, et al. "The Atacama Cosmology Telescope: Lensing of CMB Temperature and Polarization Derived from Cosmic Infrared Background Cross-Correlation" (2015). *ApJ*, 808, 7, `arXiv:1412.0626 [astro-ph.CO]`.

59. E. Calabrese, et al. "Precision Epoch of Reionization Studies with Next-Generation CMB Experiments" (2014). *JCAP*, 08, 010, `arXiv:1406.4794 [astro-ph.CO]`.

60. S. K. Naess, et al. "The Atacama Cosmology Telescope: CMB Polarization at $200 < \ell < 9000$" (2014). *JCAP* 10, 007, `arXiv:1405.5524 [astro-ph.CO]`.

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62. B. D. Sherwin, et al. "The Atacama Cosmology Telescope: Cross-Correlation of CMB Lensing and Quasars" (2012). *Phys. Rev. D*, 86, 083006, `arXiv:1207.4543 [astro-ph.CO]`.

63. E. D. Reese, et al. "The Atacama Cosmology Telescope: High-Resolution Sunyaev-Zel'dovich Array Observations of ACT SZE-selected Clusters from the Equatorial Strip" (2012). *ApJ*, 751, 12, `arXiv:1108.3343 [astro-ph.CO]`.

Conference proceedings / White papers:

1. B. Bolliet, et al. "`class_sz` I: Overview" (2023). *Proc. of the mm Universe 2023 Conference*. `arXiv:2310.18482 [astro-ph.CO]`.

2. K. Abazajian, et al. "Snowmass 2021 CMB-S4 White Paper" (2022). *Snowmass 2021 White Paper*. `arXiv:2203.08024 [astro-ph.CO]`.

3. C. L. Chang, et al. "Snowmass2021 Cosmic Frontier: Cosmic Microwave Background Measurements White Paper" (2022). *Snowmass 2021 White Paper*. `arXiv:2203.07638 [astro-ph.CO]`.

4. E. J. Baxter, et al. "Snowmass2021: Opportunities from Cross-survey Analyses of Static Probes" (2022). *Snowmass 2021 White Paper*. `arXiv:2203.06795 [hep-ex]`.

5. E. Abdalla, et al. "Cosmology Intertwined: A Review of the Particle Physics, Astrophysics, and Cosmology Associated with the Cosmological Tensions and Anomalies" (2022). *Snowmass 2021 White Paper. Journal of High Energy Astrophysics*, 34, 49, `arXiv:2203.06142 [astro-ph.CO]`.
6. B. Maffei, et al. "BISOU: a balloon project to measure the CMB spectral distortions" (2021). *Proceedings of the 16th Marcel Grossmann Meeting on Recent Developments in Theoretical and Experimental General Relativity, Astrophysics and Relativistic Field Theories*, July 5-9, 2021, `arXiv:2111.00246 [astro-ph.CO]`.
7. D. Alonso, et al. "Combining information from multiple cosmological surveys: inference and modeling challenges" (2021). *Response to 2021 NASA/DOE Request for Information Solicitation*. `arXiv:2103.05320 [astro-ph.CO]`.
8. J. Chluba, et al. "New Horizons in Cosmology with Spectral Distortions of the Cosmic Microwave Background" (2019). *ESA Voyage 2050 White Paper*. `arXiv:1909.01593 [astro-ph.CO]`.
9. K. Basu, et al. "A Space Mission to Map the Entire Observable Universe using the CMB as a Backlight" (2019). *ESA Voyage 2050 White Paper*. `arXiv:1909.01592 [astro-ph.CO]`.
10. J. Delabrouille, et al. "Microwave Spectro-Polarimetry of Matter and Radiation across Space and Time" (2019). *ESA Voyage 2050 White Paper*. `arXiv:1909.01591 [astro-ph.CO]`.
11. S. Hanany, et al. "PICO: Probe of Inflation and Cosmic Origins" (2019). *Astro2020 Project White Paper*. `arXiv:1908.07495 [astro-ph.IM]`.
12. K. Abazajian, et al. "CMB-S4 Decadal Survey APC White Paper" (2019). *Astro2020 Project White Paper*. `arXiv:1908.01062 [astro-ph.IM]`.
13. A. Kogut, et al. "CMB Spectral Distortions: Status and Prospects" (2019). *Astro2020 Project White Paper*. `arXiv:1907.13195 [astro-ph.CO]`.
14. The Simons Observatory Collaboration: M. H. Abitbol, ..., **J. C. Hill**, et al. "The Simons Observatory: Astro2020 Decadal Project Whitepaper" (2019). *Astro2020 Project White Paper*. `arXiv:1907.08284 [astro-ph.IM]`.
15. N. Battaglia and **J. C. Hill**, et al. "Probing Feedback in Galaxy Formation with Millimeter-wave Observations" (2019). *Astro2020 Science White Paper*. `arXiv:1903.04647 [astro-ph.CO]`.
16. J. Chluba, et al. "Spectral Distortions of the CMB as a Probe of Inflation, Recombination, Structure Formation and Particle Physics"

(2019). *Astro2020 Science White Paper*. `arXiv:1903.04218 [astro-ph.CO]`.

17. P. D. Meerburg, et al. "Primordial Non-Gaussianity" (2019). *Astro2020 Science White Paper*. `arXiv:1903.04409 [astro-ph.CO]`.
18. D. Green, et al. "Messengers from the Early Universe: Cosmic Neutrinos and Other Light Relics" (2019). *Astro2020 Science White Paper*. `arXiv:1903.04763 [astro-ph.CO]`.
19. T. Mroczkowski, et al. "A High-resolution SZ View of the Warm-Hot Universe" (2019). *Astro2020 Science White Paper*. `arXiv:1903.02595 [astro-ph.CO]`.
20. K. Basu, et al. "SZ spectroscopy in the coming decade: Galaxy cluster cosmology and astrophysics in the submillimeter" (2019). *Astro2020 Science White Paper*. `arXiv:1903.04944 [astro-ph.CO]`.
21. N. Sehgal, et al. "Science from an Ultra-Deep, High-Resolution Millimeter-Wave Survey" (2019). *Astro2020 Science White Paper*. `arXiv:1903.03263 [astro-ph.CO]`.
22. C. Cicone, et al. "The hidden circumgalactic medium" (2019). *Astro2020 Science White Paper*. `arXiv:1903.04531 [astro-ph.GA]`.
23. J. Baker, et al. "Multimessenger science opportunities with mHz gravitational waves" (2019). *Astro2020 Science White Paper*. `arXiv:1903.04417 [astro-ph.HE]`.
24. S. E. Clark, J. E. G. Peek, **J. C. Hill**, and M. E. Putman. "Quantifying the Magnetic Alignment of HI and Dust in the Diffuse ISM" (2016). *Proceedings of the International Astronomical Union — From Interstellar Clouds to Star-Forming Galaxies: Universal Processes?*, 315, E13.
25. **J. C. Hill**. "The Sunyaev-Zel'dovich Effect and Large-Scale Structure" (2015). *Proceedings of the XIth Rencontres du Vietnam – Cosmology: 50 Years After CMB Discovery*, Quy Nhon, Vietnam, August 16-22, 2015, `arXiv:1510.06237 [astro-ph.CO]`.

Selected Recent Talks (over 100 invited talks given)

"Detection of Thermal SZ — CMB Lensing Cross-Correlation in Planck Legacy Data"
Plenary Talk, *mm Universe*, LPSC, Grenoble, FR, June 2023

"Searching for Cosmological Concordance with New Physics in the Dark Sector: Hints and Challenges"
Invited Talk, *Copernicus Webinar Series*, Zoom, June 2023
Invited Talk, *Workshop on Cosmic Tensions*, PDT Partners / UPenn, New York, NY, May 2023
Invited Astrophysics Colloquium, Princeton University / Institute for Advanced Study, Princeton, NJ, Mar. 2023

Invited BCCP/Cosmology Seminar, UC-Berkeley, Berkeley, CA, Feb. 2023
Cosmology/KEG Seminar, Stanford University, Stanford, CA, Feb. 2023

"CMB Spectral Distortions: Foreground Modeling and Mitigation"
Invited Talk, *Mission: Spectro-polarimetry of the Microwave Sky*, Oct. 2022, Lorentz Center @ Oort, Leiden, NL

"Cosmology and Astrophysics with the Kinematic SZ Effect"
Invited Talk, *2nd Roman Juszkiewicz Symposium*, Nicolaus Copernicus Astronomical Centre, Warsaw, PL, Sept. 2022

"Toward Cosmological Concordance with New Physics in the Dark Sector"
Invited Talk, *Cosmological Probes of New Physics*, University of Maryland, College Park, MD, Sept. 2022
Invited Talk, *Tensions in Cosmology*, Corfu, GR, Sept. 2022
Invited Talk, *Intriguing Inconsistencies in the Growth of Structure Over Cosmic Time*, Sexten Center for Astrophysics, Sesto, IT, Jul. 2022

"On the Hunt for New Physics with the Atacama Cosmology Telescope"
Invited Talk, Cosmological and Astrophysical Probes of New Physics Workshop, Princeton University, Princeton, NJ, Apr. 2022

"Cosmology and Astrophysics with the Atacama Cosmology Telescope"
Contributed Talk, APS April Meeting, New York, NY, Apr. 2022

"Perspectives on H_0 and S_8"
Invited Talk, Snowmass Cosmology Intertwined Workshop, Zoom, Nov. 2021

"Searching for New Physics in the Universe's Oldest Light with the Atacama Cosmology Telescope"
Invited NeXus Seminar, Zoom/Brown University, Nov. 2022
Invited Colloquium, Kavli Institute for Cosmological Physics, University of Chicago, Chicago, IL, Feb. 2022
Invited Colloquium, Institute of Cosmology and Gravitation, University of Portsmouth, Portsmouth, UK, Jan. 2022
CCA Lunch Seminar, Flatiron Institute, New York, NY, Dec. 2021
Invited Particle Theory Seminar, Johns Hopkins University, Baltimore, MD, Dec. 2021
Invited Cosmology Seminar, Brown University, Providence, RI, Dec. 2021
Invited Physics Colloquium, Brandeis University, Waltham, MA, Nov. 2021
Invited Astronomy Colloquium, UC-Santa Cruz, Santa Cruz, CA, Nov. 2021
Invited Stockholm/Oskar Klein Centre Cosmology and Gravitation Seminar, Stockholm, SE, Oct. 2021
Invited Oxford Cosmology Seminar, Oxford, UK, Oct. 2021
Invited NYU CCPP Astrophysics Seminar, New York, NY, Oct. 2021
Invited Aspen Center for Physics Colloquium, Aspen, CO, Sept. 2021

"Non-Gaussian Information in CMB Secondary Anisotropies"
Learn the Universe Workshop, Aug. 2021, Flatiron Institute, New York, NY

"Constraining the Baryon Abundance with the Kinematic Sunyaev-Zel'dovich Effect: Projected-Field Detection Using Planck, WMAP, and unWISE"
Invited Talk & Panelist, KITP Program on Fundamentals of Gaseous Halos, Santa Barbara, CA, Mar. 2021

"Exploring Cosmological Concordance with ACT DR4, Planck, and Beyond"
Invited Talk, 16th Marcel Grossmann Meeting, Jul. 2021
Invited Talk, Hubble Tension Workshop, University of Southampton, Mar. 2021
Invited Plenary Talk, Tehran Meeting on Cosmology at the Crossroads, Feb. 2021

"Early Dark Energy and Cosmological Concordance"
Invited Astrophysics Seminar at Stony Brook University, Sept. 2020, Stony Brook, NY
Invited Astronomy Colloquium, University of Texas, Sept. 2020, Austin, TX
Invited Seminar at Brown University Center for the Fundamental Physics of the Universe, Jul. 2020, Providence, RI
Invited CosmoClub Seminar, May 2020, ETH, Zurich, CH
Invited Cosmology Lunch Talk, Mar. 2020, Institute for Advanced Study, Princeton, NJ

Posters

"The Atacama Cosmology Telescope: A Measurement of the Thermal Sunyaev-Zel'dovich One-Point Probability Distribution Function"
Closing in on the Cosmological Model, Mar. 2015, Aspen, CO
Planck 2014: The Microwave Sky in Temperature and Polarization, Dec. 2014, Ferrara, Italy

"Observing Primordial non-Gaussianity via the Thermal Sunyaev-Zel'dovich Effect"
Essential Cosmology for the Next Generation, Jan. 2012, Cancun, MX
awarded prize for best poster at conference

"Do We Live in a Void? Testing via the kSZ Effect"
The Cosmic Enigma: Cosmology and Particle Astrophysics, Jun. 2010, University College London, London, UK

"The Mass Function of Nearby Galaxy Clusters: Cosmological Constraints"
211th Meeting of the American Astronomical Society, Jan. 2008, Austin, TX

Teaching Experience

Instructor: Introduction to General Relativity (Columbia Physics GU4040)
Spring 2024

Instructor: Physical Cosmology (Columbia Physics GR6010)
Fall 2022, Fall 2023

Instructor: Advanced Mechanics (Columbia Physics GU4003)
Spring 2020, Spring 2021, Spring 2022

Instructor: Graduate Student Seminar (Columbia Physics GR6905)
Spring 2020, Fall 2020

Teaching Assistant: General Relativity (Princeton Astro 301), Fall 2011

Grader: Relativity (MIT 8.033), Fall 2006

Students Supervised (all supervised publications listed above)

Aleksandra Kusiak (Ph.D. student, Columbia): current Ph.D. advisor; three lead-author and several co-authored publications completed

Kristen Surrao (Ph.D. student, Columbia): current Ph.D. advisor; two lead-author publications completed

Alina Sabyr (Ph.D. student, Columbia): current Ph.D. advisor; one lead-author publication completed

Sam Goldstein (Ph.D. student, Columbia): current Ph.D. advisor; three lead-author publications completed

Michael Rodriguez (Bridge to Ph.D. Program scholar, Columbia): current advisor

Leander Thiele (master's student, Perimeter Institute; Ph.D. student, Princeton): co-advisor with Kendrick Smith on two lead-author publications; co-advisor with David Spergel on one lead-author publication; primary advisor on one lead-author publication

Maximilian Abitbol (Ph.D. 2018, Columbia): co-advisor with Bradley Johnson on one lead-author publication; primary advisor on one lead-author publication

Johnny Greco (Ph.D. 2018, Princeton): co-advisor with David Spergel on one lead-author publication

Susan Clark (Ph.D. 2017, Columbia): co-advisor with Josh Peek and Mary Putman on one lead-author publication

Jia Liu (Ph.D. 2016, Columbia): co-advisor with Zoltán Haiman on one lead-author publication; primary advisor on two lead-author publications

Lucie Afko (Simons-NSBP scholar, Johns Hopkins): research advisor for Simons-National Society of Black Physicists summer program (2023)

Sultan Abylkairov (undergraduate 2021, Nazarbayev University, Kazakhstan): co-advisor with Blake Sherwin on one lead-author publication

Alvaro Ortiz-Vazquez (undergraduate 2017, Columbia): primary advisor on summer research project, yielding co-authored publication

Outreach

"A Brief History of the Universe"
outreach talk to undergraduates in Columbia Science Research Fellows program
October 2023, Columbia University, New York, NY
outreach talk to students in summer REU research program
July 2023, Columbia University, New York, NY

"Searching for New Physics in the Universe's Oldest Light"
Westchester Amateur Astronomers Club lecture, June 2023, Pace University, Pleasantville, NY
Science-on-Hudson public lecture, February 2023, Nevis Laboratories, Irvington, NY, `https://www.youtube.com/watch?v=ayYgEKFflj4`

"Searching for New Physics in the Universe's Oldest Light with the Atacama Cosmology Telescope"
outreach talk to students in summer REU research program
June 2022, Columbia University, New York, NY
December 2021, Society of Physics Students Outreach Talk, Columbia University

Instructor and Course Content Developer, CMB-S4 Data Analysis Summer School, August 2021
`https://sites.google.com/cmb-s4.org/summer-school-2021/home`

Instructor, ACT CMB Data School, April 2021
`https://sites.google.com/view/actdataschool`

Columbia University Bridge Program Selection Committee (2021, 2023)

"The CMB's mixed messages on early dark energy & theory's response"
April 2022, YouTube Cosmology Talk: `https://www.youtube.com/watch?v=T15WSiHdOFI`

"Searching for New Physics in the Universe's Oldest Light"
December 2021, Society of Physics Students Outreach Talk, Columbia University

"The Hubble Conundrum: A Potential Hint of New Physics in the Universe's

Oldest Light"
August 2020, Heinz R. Pagels Physics Talk, Aspen Center for Physics, Aspen CO, https://www.youtube.com/watch?v=5yKrSy18u0A
October 2020, Society of Physics Students Outreach Talk, Columbia University

"Early Dark Energy and Cosmological Concordance"
May 2020, YouTube Cosmology Talk: https://www.youtube.com/watch?v=5JRHFGuPAV8

"Dust, Distortions, and Shadows in the Universe's Oldest Light"
cover article for Spring 2015 issue of Sigma Pi Sigma *Radiations*
http://www.sigmapisigma.org/sigmapisigma/radiations/spring-2015

"Galaxy Clusters and the Sunyaev-Zel'dovich Effect"
outreach talk to students in undergraduate summer research program
June 2012, Princeton University, Princeton, NJ

Professional Activities

Advanced Simons Observatory Co-Project Scientist (2023 - present)
Simons Observatory Theory and Analysis Committee Member (2018 - present)
Simons Observatory Foreground Analysis Working Group Co-Lead (2017 - 2022) + Advisor (2023 - present)
Simons Observatory SZ Analysis Working Group Co-Lead (2020 - 2022)
Simons Observatory Collaboration Oversight Committee Member (2019 - 2021)
Atacama Cosmology Telescope – Dark Energy Survey Joint Analysis Co-Coordinator (2017 - present)
CMB-S4 Science Council Member: Co-Coordinator of Galaxy Formation and Evolution Analysis Working Group (2017 - 2019)
Probe of Inflation and Cosmic Origins (PICO) Executive Team Member (2017 - present)

IAS/Princeton Joint Astrophysics Colloquium Organizer (2018-2019)
CCA Tri-State Cosmology × Data Science Group Meeting Organizer (2019 - 2022)

Conference Organizer: Future Science with CMB × LSS, April 2023, Yukawa Institute for Theoretical Physics, Kyoto University:
https://www2.yukawa.kyoto-u.ac.jp/~cmb-lss/index.php
Workshop Organizer: Sunyaev-Zel'dovich Science in the 2020s, June 2022, Flatiron Institute, New York, NY:
https://indico.flatironinstitute.org/event/3100/
Convener: COSMO '21, August 2021, University of Illinois (remote):
https://caps.ncsa.illinois.edu/conferences/cosmo21/

Workshop Co-organizer: The Nonlinear Universe 2018, July 2018, Smartno, Slovenia: `http://bccp.berkeley.edu/2018-non-linear-universe/`
Workshop Organizer: CMB Foregrounds at CCA, June 2018, Flatiron Institute, New York, NY
Workshop Co-organizer: Neutrinos and Light Particles in Cosmology, June 2016, UC Berkeley, Berkeley, CA:
`http://bccp.berkeley.edu/neutrinocosmology2016/`

Referee for: *Physical Review Letters*, *Physical Review D*, *The Astrophysical Journal*, *Monthly Notices of the Royal Astronomical Society*, *Journal of Cosmology and Astroparticle Physics*, *Nature Astronomy*, *Astronomy & Astrophysics*, *Physics Letters B*, *Physics of the Dark Universe*

NASA Panel Reviewer: NESSF (2017–2019), ATP (2019, 2021)
NSF AAG Panel Reviewer (2018)
UK STFC Proposal Reviewer (2019)
European Research Council Proposal Reviewer (2020)

American Astronomical Society Member
American Physical Society Member

Princeton Astrophysics "Wunch" (Wednesday Lunch) Seminar Organizer 2010-11
MIT Society of Physics Students: President (2007-8); Secretary (2006-7)

References

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