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Gerrit Farren

Curriculum Vitae

I am a Owen Chamberlain Postdoctoral fellow at Lawrence Berkeley National Laboratory. I obtained my PhD in Applied Mathematics and Theoretical Physics from the University of Cambridge in July 2024 and a Bachelor of Science in Physics from Haverford College in May of 2020. My interests lie at the intersection of theoretical and observational cosmology. I am working on analysing the large scale structure of the universe using galaxy surveys and gravitational lensing of the cosmic microwave background. I develop and test new approaches and models to probe fundamental physics such as neutrino masses, dark matter properties, and structure formation.

Education

Oct 2020 – July 2024	**PhD Applied Mathematics and Theoretical Physics**, *University of Cambridge*, Cambridge, United Kingdom
Aug 2016 – May 2020	**BSc Physics**, *Haverford College*, Haverford, PA United States, Graduated *Summa Cum Laude* in May 2020 with 3.98/4 GPA Physics Major, Mathematics Minor, Scientific Computing Concentration
Sep 2007 – Jun 2015	**Abitur**, *Hugo-Junkers-Gymnasium*, Mönchengladbach, Germany, June 2015

Employment

Sep 2024 – present	**Postdoctoral Fellow**, *Lawrence Berkeley National Laboratory*, Berkeley, CA United States
May 2023 – June 2023	**Affiliate Researcher**, *Lawrence Berkeley National Lab*, CA, United States
Oct 2020 – May 2024	**Undergraduate Supervisor**, *University of Cambridge*, United Kingdom
Oct 2021 – Jan 2022	**Example Class Instructor**, *University of Cambridge*, United Kingdom
Sep 2018 – May 2020	**Course Assistant**, *Haverford College*, PA, United States
Jan 2017 – May 2020	**Research Assistant**, *Haverford College*, PA, United States
May 2019 – Aug 2019	**Summer Research Student**, *Durham University*, United Kingdom
Jun 2018 – Aug 2018	**Summer Research Student**, *Imperial College London*, United Kingdom
May 2017 – Jul 2017	**Research Assistant**, *Institute for Nuclear Physics - Research Center Jülich*, Germany
Aug 2015 – Aug 2016	**Research Assistant**, *Institute for Nuclear Physics - Research Center Jülich*, Germany

Awards and Recognitions

2024 – present	**Owen Chamberlain Postdoctoral Fellowship**, *Lawrence Berkeley National Laboratory*
2020 – 2024	**Isaac Newton Studentship**, *University of Cambridge*
2020 – 2023	**Honorary Vice Chancellor's Award**, *University of Cambridge*

2020 – 2023 **Helen Stone Scholarship**, *University of Cambridge*

2020 **American Physical Society LeRoy Apker Award finalist**, *Haverford College*

2019 **Royal Astronomical Society Undergraduate Research Bursary**, *Durham University*

2019 **Phi Beta Kappa**, *Haverford College*, Inducted junior year

2016 – 2020 **Class of 1950 International Student Scholarship**, *Haverford College*

2016 – 2017 **The Robert Maquinay 1948 Scholarship and C.V. Star Scholarship**, *Haverford College*

Publications

First author publications

Gerrit S. Farren, Alex Krolewski, Frank J. Qu, Simone Ferraro, et al. The Atacama Cosmology Telescope: Multi-probe cosmology with unWISE galaxies and ACT DR6 CMB lensing. *arXiv e-prints*, art. arXiv:2409.02109, September 2024a. submitted to Physical Review D.

Gerrit S. Farren, Blake D. Sherwin, Boris Bolliet, Toshiya Namikawa, Simone Ferraro, and Alex Krolewski. Detection of the CMB lensing – galaxy bispectrum. *arXiv e-prints*, art. arXiv:2311.04213, November 2023. submitted to Physical Review Letters.

Gerrit S. Farren, Alex Krolewski, Niall MacCrann, Simone Ferraro, et al. The Atacama Cosmology Telescope: Cosmology from Cross-correlations of unWISE Galaxies and ACT DR6 CMB Lensing. *The Astrophysical Journal*, 966(2):157, May 2024b.

Gerrit S. Farren, Oliver H. E. Philcox, and Blake D. Sherwin. Determining the Hubble constant without the sound horizon: Perspectives with future galaxy surveys. *Phys. Rev. D*, 105:063503, Mar 2022a.

Gerrit S. Farren, Daniel Grin, Andrew H. Jaffe, Renée Hložek, and David J. E. Marsh. Ultralight axions and the kinetic Sunyaev-Zel'dovich effect. *Phys. Rev. D*, 105:063513, Mar 2022b.

Gerrit S. Farren, Bruce Partridge, Rüdiger Kneissl, Simone Aiola, Rahul Datta, Megan Gralla, and Yaqiong Li. Confirming the calibration of ALMA using *Planck* observations. *The Astrophysical Journal Supplement Series*, 256(1):19, Sep 2021.

Selected co-authored works

The ACT Collaboration. The Atacama Cosmology Telescope: DR6 Gravitational Lensing Map and Cosmological Parameters. *arXiv e-prints*, art. arXiv:2304.05203, April 2023a. to appear in The Astrophysical Journal.

The ACT Collaboration. The Atacama Cosmology Telescope: A Measurement of the DR6 CMB Lensing Power Spectrum and its Implications for Structure Growth. *arXiv e-prints*, art. arXiv:2304.05202, April 2023b. to appear in The Astrophysical Journal.

The ACT Collaboration. The Atacama Cosmology Telescope: Mitigating the impact of extragalactic foregrounds for the DR6 CMB lensing analysis. *arXiv e-prints*, art. arXiv:2304.05196, April 2023c. to appear in The Astrophysical Journal.

Oliver H. E. Philcox, c, Blake D. Sherwin, Eric J. Baxter, and Dillon J. Brout. Determining the Hubble constant without the sound horizon: A 3.6% constraint on H_0 from galaxy surveys, CMB lensing, and supernovae. *Phys. Rev. D*, 106:063530, Sep 2022.

Oliver H. E. Philcox, Blake D. Sherwin, **Gerrit S. Farren**, and Eric J. Baxter. Determining the Hubble constant without the sound horizon: Measurements from galaxy surveys. *Phys. Rev. D*, 103:023538, Jan 2021.

The ACT Collaboration. The Atacama Cosmology Telescope: two-season ACTPol extragalactic point sources and their polarization properties. *Monthly Notices of the Royal Astronomical Society*, 486 (4):5239–5262, Nov 2018.

Selected Talks

Jan 2024 **The Atacama Cosmology Telescope:Probing the large scale structure with cross-correlations between ACT DR6 CMB lensing and unWISE**, *243rd Meeting of the American Astronomical Society*, New Orleans, USA, (contributed talk)

Nov 2023 **The Atacama Cosmology Telescope: Cosmology from DR6 CMB lensing cross-correlations with unWISE**, *Cosmology and Particle Physics Seminar*, University of Geneva, Geneva, Switzerland, (invited seminar)

Nov 2023 **The Atacama Cosmology Telescope: Cosmology from DR6 CMB lensing and cross-correlations with unWISE**, *Waterloo Centre for Astrophysics Seminar*, University of Waterloo, Waterloo, Canada, (invited seminar)

Oct 2023 **The Atacama Cosmology Telescope: DR6 lensing release and cross-correlations with unWISE**, *CosmoPalooza 2023*, online, (invited talk)

Aug 2023 **New results from unWISE $\times$ Planck lensing and towards unWISE $\times$ ACT DR6 lensing**, *Understanding Cosmological Observations 2023*, Centro de Ciencias de Benasque Pedro Pascual, Benasque, Spain, (contributed talk)

Aug 2023 **Towards high precision CMB lensing cross-correlations with unWISE galaxies**, *CMB-S4 Collaboration Annual Meeting 2023*, online, (invited talk)

April 2022 **Measuring $\mathbf{H_0}$ using the equality scale with present and future galaxy surveys**, *American Physical Society April Meeting 2022*, New York City, USA, (contributed talk)

Technical and Personal skills

- **Programming Languages:** Python, C++, C#
  Including parallel and distributed computing, large datasets, numeric simulations.
- **Data analysis:** Parametric modelling, Bayesian model inference, model comparison, data compression
- **Languages:** German (native language), English (fluent written and spoken)