
Ayngaran Thavanesan, Ph.D.

Email: at735@cantab.ac.uk

Website: ayngaranthavanesan.github.io

ACADEMIC POSITIONS

Laboratory for Theoretical Fundamental Physics - EPFL, Switzerland Postdoctoral Research Scientist	Aug. 2025 - Present
<i>Mentor:</i> Prof. Victor Gorbenko	
Department for Theoretical Physics - CERN, Switzerland Scientific Collaborator	Aug. 2025 - Present
<i>Mentors:</i> Prof. Shota Komatsu and Prof. Timothy Cohen	
DAMTP - University of Cambridge, UK Postdoctoral Research Scientist	Jul. 2025 - Aug. 2025
<i>Mentor:</i> Prof. Aron C. Wall	

EDUCATION

DAMTP - University of Cambridge, UK	2020 - 2025
Jesus College, University of Cambridge	2021 - 2025
PhD candidate in Applied Mathematics & Theoretical Physics	
Institute of Physics (IOP) Bell Burnell Graduate Scholarship	
Cavendish Scholarship	
Jesus College David & Susan Hibbitt Scholarship (honorary)	
Thesis: ‘The Phase of the Cosmological Wavefunction’	
<i>Thesis advisor:</i> Prof. Aron C. Wall	
School of Physics and Astronomy, Queen Mary University of London, UK	2018 - 2019
MSc in Astrophysics & Theoretical Physics	
MSc: Distinction (Rank: 1/25, 82%)	
Master’s Thesis: ‘Modelling Cosmological Perturbations in Metric Theories of Gravity’ (<i>Dr. Timothy Clifton</i>)	
The Drapers’ Company Prize	
Emmanuel College, University of Cambridge, UK	2015 - 2018
BA (Hons) in Natural Sciences	
Rowley Mainhood Prize	
Senior Exhibitioner Election	
Whitgift School, Croydon, UK	2007 - 2014
Whitgift Academic Scholarship & Bursary	

SELECTED AWARDS AND PRIZES

Kavli Institute for Theoretical Physics Graduate Fellowship	Oct. 2024
6-month fellowship at KITP; mentored by Prof. Clifford Johnson & Dr. Mykhaylo Usatyuk.	USA
Smith-Knight & Rayleigh-Knight Prize	Mar. 2023
Awarded for my outstanding and striking research results by Cambridge Mathematics Department.	Cambridge
Student-Led Teaching Awards (SLTAs)	Mar. 2022
Shortlisted from amongst over 400 nominations for my teaching across Cambridge University.	Cambridge
Jesus College David & Susan Hibbitt Scholarship (3 years) [declined]	Jun. 2021
Awarded £42000 for PhD position at University of Cambridge by Jesus College, Cambridge.	Cambridge

SELECTED AWARDS AND PRIZES (cont.)

Institute of Physics (IOP) Bell Burnell Graduate Scholarship (3.5 years)	Apr. 2021
Awarded ~£40000 for PhD position at University of Cambridge by the UK's Institute of Physics.	Cambridge
Cavendish Scholarship (3.5 years)	Mar. 2021
Awarded ~£90000 for PhD position at University of Cambridge by the Cavendish Trust.	Cambridge
de Sitter Fellowship (4 years) [declined]	Feb. 2021
Joint PhD position at Instituut-Lorentz for Theoretical Physics and Leiden Observatory.	Netherlands
Delta Institute for Theoretical Physics PhD Visitor Programme	Awarded 2021 (postponed COVID)
6-month PhD visitor programme with Prof. Subodh Patil & Prof. Jan Pieter van der Schaar.	Netherlands
Visiting Scholar at Institute of Astronomy, Cambridge	Sep. 2020
Visiting scholar's grant to work within the University of Cambridge's cosmology departments.	Cambridge, UK

PUBLICATIONS

* = Author list alphabetised

An up-to-date list of my publications and additional information can be found on [arXiv](#) and on my [website](#).

1. **Thavanesan, A.**, Werth, D., Handley, W. "Analytical approximations for curved primordial power spectra", *published in Physical Review D* ([PhysRevD.103.023519](#)).
2. *Cabass, G., Stefanyszyn D., Supel, J., **Thavanesan, A.** "On Graviton non-Gaussianities in the Effective Field Theory of Inflation", *published in JHEP* ([JHEP10\(2022\)154](#)).
3. *Goodhew, H., **Thavanesan, A.**, Wall, A.C. "The Cosmological CPT Theorem", , *published in SciPost (SciPostPhys.20.2.049(2026))*.
4. **Thavanesan, A.** "No-go Theorem for Cosmological Parity Violation", ([arXiv:2501.06383](#)), *accepted for publication in Journal of Cosmology and Astroparticle Physics*.
5. ***Thavanesan, A.** and Wall, A.C. "Kosmic Field Theories: Towards Holographic Duals for Unitary String Cosmologies", ([arXiv:2510.21701](#)), *accepted for publication in JHEP*.
6. *Araujo-Regado, G., **Thavanesan, A.**, Wall, A.C. "Holographic Cosmology at Finite Time", ([arXiv:2511.04511](#)), *accepted for publication in JHEP*.
7. *Msolla, E. and **Thavanesan, A.**, "Analytical approximations for curved primordial tensor spectra", ([arXiv:2511.10644](#)), *accepted for publication in Physical Review D*.
8. *Shyam, V., Silverstein, E., Soni, R. M, **Thavanesan, A.**, Torroba, G. "dS/CFT from $T\bar{T} + \Lambda_d$ ", *in preparation*.
9. **Thavanesan, A.** "A Gentle Introduction to Cauchy Slice Holography", *in preparation*.
10. **Thavanesan, A.** "Going through Phases in Cosmology", *in preparation*.

ACADEMIC VISITS

School of Natural Sciences	
Institute for Advanced Study, Princeton	TBC
Visiting scholar with Prof. Nima Arkani-Hamed	USA
Brown Theoretical Physics Center	
Department of Physics, Brown University	TBC
Visiting scholar with Prof. Stephon Alexander	USA
Department of Theoretical Physics, CERN	
Department of Theoretical Physics, CERN	Aug. 2025 - Present
Scientific Collaborator with Prof. Shota Komatsu and Prof. Timothy Cohen	Switzerland

ACADEMIC VISITS (cont.)

Perimeter Institute for Theoretical Physics		
Perimeter Institute for Theoretical Physics		Aug. 2025
<i>Visiting researcher with Prof. Robert C. Myers and Dr. Joshua Kirklin</i>		Canada
Kavli Institute for Theoretical Physics		
University of California, Santa Barbara		Jan. - Jun. 2025
<i>KITP Graduate fellow; mentored by Prof. Clifford Johnson and Dr. Mykhaylo Usat�uk</i>		USA
Center for Computational Astrophysics		
Flatiron Institute - Simons Foundation		Jun. - Jul. 2024
<i>Visiting scholar with Dr. Cyril Creque-Sarbinowski</i>		USA
Stanford Institute for Theoretical Physics		
Varian Physics Lab Stanford		Feb. - Mar. 2024
<i>Visiting scholar with Prof. Eva Silverstein & Prof. Leonard Susskind</i>		USA
Delta Institute for Theoretical Physics		
Amsterdam & Leiden		Postponed COVID
<i>Visiting scholar with Prof. Daniel Baumann & Prof. Jan Pieter van der Schaar</i>		Netherlands
University of Cambridge		
Kavli Institute for Cosmology, Cambridge		Oct. 2020 - Sep. 2021
<i>Visiting scholar's grant to work within the University of Cambridge's cosmology departments</i>		Cambridge, UK

TALKS - ACADEMIC & PUBLIC

† = Invited talk	
†May 2026	Holographic Universe 2026 <i>Towards Holographic Duals for Cosmology</i>
†Mar. 2026	CERN (TH String Theory Seminar) <i>Towards Holographic Duals for Cosmology</i>
†Feb. 2026	Early Universe from Home 2026) <i>Towards Holographic Duals for Cosmology</i>
†Dec. 2025	Quantum Cosmology Seminar Series (online) <i>Kosmic Field Theories: Towards Holographic Duals for Cosmology</i>
†Nov. 2025	Durham Amplitudes and Correlators Journal Club <i>Holographic Cosmology through the Cosmological CPT Theorem</i>
†Nov. 2025	STAG Research Centre, Southampton (String Theory Seminar) <i>Kosmic Field Theories: Holographic Duals to Strings on Cosmological Backgrounds</i>
†Nov. 2025	Department of Applied Mathematics & Theoretical Physics, Cambridge (QF&S Seminar) <i>Kosmic Field Theories: Holographic Duals to Strings on Cosmological Backgrounds</i>
†Sep. 2025	Majorana-Raychaudhuri Seminar Series <i>Holographic Cosmology through the Cosmological CPT Theorem</i>
†Aug. 2025	Perimeter Quantum Fields and Strings Seminar <i>Holographic Cosmology through the Cosmological CPT Theorem</i>
†Jun. 2025	QIQQ 2025 <i>A Complex Proposal for Holographic Cosmology (1 min + Poster)</i>
†Jun. 2025	UCSB/KITP High Energy and Gravity Seminar <i>Holographic Cosmology through the Cosmological CPT Theorem</i>
†May. 2025	Moore Library Research Café - Light and Dark <i>Chiral Echoes from the Dawn of Time: Light, Dark, and the Arrow of Time</i>
†Apr. 2025	EPFL High Energy Theory Seminar <i>The Cosmological CPT Theorem</i>
†Mar. 2025	Caltech High Energy Theory Seminar <i>The Cosmological CPT Theorem</i>

TALKS - ACADEMIC & PUBLIC (cont.)

Jan. 2025	Strings 2025 <i>To dS/CFT and back through Cauchy Slice Holography</i>
†Nov. 2024	Parity Violation from Home 2024 <i>No-go Theorem for Cosmological Parity Violation</i>
Nov. 2024	UKQFT XIII <i>The Cosmological CPT Theorem</i>
†Nov. 2024	Department of Applied Mathematics & Theoretical Physics, Cambridge (GR Seminar) <i>To dS/CFT and back through Cauchy Slice Holography</i>
†Oct. 2024	Looping in the Primordial Universe) <i>The Cosmological CPT Theorem</i>
†Oct. 2024	Holography @DITP Meeting <i>To dS/CFT and back through Cauchy Slice Holography</i>
†Oct. 2024	Nottingham Particle Cosmology Seminar (Centre for Astronomy and Particle Theory) <i>To dS/CFT and back through Cauchy Slice Holography</i>
†Oct. 2024	Swansea Theory Seminar (Particle Theory and Cosmology Group) <i>The Cosmological CPT Theorem</i>
†Oct. 2024	KCL Cosmology Meeting <i>Insights into Cosmology and Holography from the Wavefunction of the Universe</i>
†Sep. 2024	University of Jaffna <i>The Quantum World and the Early Universe</i>
†Sep. 2024	McGill High Energy Theory Group Meeting <i>The Cosmological CPT Theorem</i>
†Jul. 2024	Center for Computational Astrophysics - Simons Foundation - Cosmology Meeting <i>The Cosmological CPT Theorem</i>
Jun. 2024	Cosmology from Home 2024 <i>The Cosmological CPT Theorem</i>
Jun. 2024	Amplitudes 2024 <i>dS/CFT from $T\bar{T}$ + Λ_d (5 mins)</i>
†May. 2024	Snapshots for Research 2024 <i>The Quantum World and the Early Universe</i>
†Apr. 2024	Nottingham Theory Seminar (Centre for Astronomy and Particle Theory) <i>The Cosmological CPT Theorem</i>
†Mar. 2024	IAS Quantum Aspects of Black Holes Meeting <i>The Cosmological CPT Theorem</i>
†Jan. 2024	Berkeley String Seminar <i>The Cosmological CPT Theorem</i>
†Jan. 2024	MURI Meeting <i>The Cosmological CPT Theorem</i>
†Nov. 2023	KITP High Energy and Gravity Seminar <i>Holographic Cosmology at finite cutoff</i>
April. 2023	Quantum de Sitter Universe <i>The Cosmological CPT Theorem (5 mins)</i>
Jan. 2023	UK-QFT XI <i>On Graviton non-Gaussianities in the Effective Field Theory of Inflation (25 mins)</i>
Dec. 2022	YTF 22 <i>On Graviton non-Gaussianities in the Effective Field Theory of Inflation (30 mins)</i>
†Nov. 2022	Manchester Cosmology Seminar <i>On Graviton non-Gaussianities in the Effective Field Theory of Inflation</i>

TALKS - ACADEMIC & PUBLIC (cont.)

[†] = <i>Invited talk</i>	
Jul. 2022	Cosmology from Home 2022 <i>On Graviton non-Gaussianities in the Effective Field Theory of Inflation</i> (18+10 mins)
Jun. 2022	STAG School on Black Holes, Cosmology and Holography <i>On Graviton non-Gaussianities in the Effective Field Theory of Inflation</i> (4+1 mins)
[†] May. 2022	UK Cosmo 2022 <i>On Graviton non-Gaussianities in the Effective Field Theory of Inflation</i> (25+5 mins)
[†] May. 2022	Strings, Cosmology and Gravity Student Conference 2022 <i>On Graviton non-Gaussianities in the Effective Field Theory of Inflation</i> (25+5 mins)
Mar. 2022	Jesus College, University of Cambridge (MCR Graduate Conference) <i>On Graviton non-Gaussianities in the Effective Field Theory of Inflation</i> (10 mins)
[†] Mar. 2022	iTelescope.net <i>The Quantum World and the Early Universe</i>
[†] Nov. 2021	Connecting the Young World Fair <i>CYWFAIR 2021: Ayngaran Thavanesan</i>
[†] Nov. 2021	Whitgift School <i>The boundaries of the universe: A journey from Whitgift to the beginning of the universe</i>
[†] Jul. 2021	Cosmology from Home (Cosmology from Home 2021) <i>Various talks</i>
Mar.-Apr. 2021	Cambridge Science Festival (Black Hole Wars) <i>Black Hole Wars: Episodes I and IV</i>
[†] Mar. 2021	Cambridge University Astronomy (Public Open Evening) <i>The topsy-turvy quantum world</i>
[†] Mar. 2021	Department of Applied Mathematics & Theoretical Physics, Cambridge (Cosmo. Journal Club) <i>Analytically approximating the primordial power spectrum in the kinetic dominance paradigm</i>
Jan. 2021	Queen Mary University of London (50th BUSSTEPP) <i>Initial conditions for the early universe</i> (4 mins)
Jan. 2021	Cambridge University & Ludwig-Maximilians-University Munich (Cosmology Workshop 2021) <i>Initial conditions for the early universe</i> (10 mins)
[†] Dec. 2020	Cambridge University Astronomy (Astronomy on Tap) <i>To Inflation and Beyond!</i>
Dec. 2020	Centre for Particle Theory, Durham (YTF 20 Conference) <i>Analytical Approximations for Curved Primordial Power Spectra</i>
[†] Jul. 2020	Department of Applied Mathematics & Theoretical Physics, Cambridge (Cosmo. Journal Club) <i>Analytical Approximations for Curved Primordial Power Spectra</i>

MENTORING & TEACHING

Advisor/Mentor <i>Mentoring Flatiron Intern</i>	Aug. 2024 - Present <i>USA & Online</i>
· Supervising undergraduate (Ezra Msolla) from underrepresented background with interests in cosmology.	
· In the paper with Ezra we derive analytical expressions for tensor power spectra in curved inflating universes.	
Lumiere Education <i>Research Project Supervisor (unpaid volunteering and paid work)</i>	Mar. 2023 - Present <i>Online</i>
· Supervised 9 students' individual research projects on various topics, including cosmology and Hawking radiation, many of whom have gone on to be admitted at prestigious universities such as Harvard and Stanford.	

MENTORING & TEACHING (cont.)

UniArk <i>Co-founder and Mentor</i>	Mar. 2021 - Present UK & Online
· Co-founded the charity UniArk with the aim to reduce the educational attainment gap of disadvantaged students.	
· Mentored students for Oxbridge and other university admissions for undergraduate, masters and PhD.	
University of Cambridge (Natural Sciences & Mathematics) <i>Examples Class Lecturer/Demonstrator & Supervisor (small group tutor)</i>	Oct. 2020 - Present Cambridge, UK
· Lectured examples class for Part III Field Theory in Cosmology and Part III Gauge/Gravity Duality.	
· Supervised (small group tutoring) for Part II General Relativity, Part II Principles of Quantum Mechanics, Part II Galactic Dynamics, Part IB Oscillations, Waves & Optics and Part IB Experimental Methods.	
Queen Mary University of London <i>Outreach Worker with Prof. Richard Nelson</i>	Sep. 2018 - Jan. 2019 London, UK
· Guided high school students through the physics and programming exercises of Planet Hunting with Python .	
The Profs, Leading Education, VIPTutors, Test Teach, Surrey Tutors <i>Tutor</i>	Jul. 2010 - Present UK & Online
· Provided tutoring for students from primary school up to university Masters level.	
· Provided interview preparation for admissions at Oxbridge and other high-ranking universities.	

PROFESSIONAL ACTIVITIES

Organiser	<i>Co-organised Quantum de Sitter Universe 1-week workshop held in April 2023.</i> <i>Co-organised DAMTP High Energy Physics & General Relativity Journal Club.</i>
Referee	<i>Wrote references for multiple students for PhD applications all of whom were successful in securing PhD positions within DAMTP, Cambridge and externally.</i>
Equality & Diversity	Taking Charge for Change: Postgraduate Widening Participation Forum 2025 <i>Panelist on discussion session regarding student experiences of postgraduate admissions for Taking Charge for Change: Postgraduate Widening Participation Forum 2025. as part of the University of Cambridge Access and participation plan.</i> King's Birthday Honours 2024 OBE nomination for Prof. Anne-Christine Davis <i>Wrote successful King's Birthday 2024 honours nomination. for Prof. Anne-Christine Davis.</i> Snapshots of Research 2024 speaker <i>Event aimed at undergraduate and Masters students to promote diversity in mathematics.</i> Promoting equality in the Physics & Astronomy community <i>Co-wrote an open letter to our physics and astronomy colleagues in support of the Asian+ community in light of horrific acts against the community in recent times.</i> Promoting equality at the University of Cambridge <i>Co-wrote successful application to fund BAME postgraduate research at Cambridge, by using my background to determine methods to tackle inequality and improve minorities' experiences.</i> Co-organiser of Cambridge DAMTP Racism Discussion Group <i>Discussion group which meets every few weeks to discuss how to tackle different forms of racism, including but not limited to cultural, economical and institutional racism.</i>
Outreach	Organiser and speaker at 2021 Cambridge Science Festival <i>Organised a series of five talks on the recent progress of the black hole information paradox.</i>
Sports	University 1st team (Blues) badminton captain, College football captain

MISCELLANEOUS

Computing Languages	Python, C, Mathematica, Java, HTML
OS	Linux, Windows, Mac OS
Programmes & Tools	L <small>A</small> T <small>E</small> X, MATLAB, CLASS, CAMB, UltraNest , healpy, Gnuplot, anesthetic
Languages	English (Native), Tamil (Mother tongue), German (Professional), French (Basic)

REFEREES

Prof. A C Wall
(PhD Supervisor)
DAMTP, Cambridge
aw846@cam.ac.uk

Prof. E Silverstein
(Collaborator)
SITP, Stanford University
evas@stanford.edu

Prof. S Komatsu
(Collaborator)
CERN
shota.komatsu@cern.ch

Prof. H Gleeson
(Head of BBGSF)
SPA, University of Leeds
h.f.gleeson@leeds.ac.uk