
Ayngaran Thavanesan, Ph.D.

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ACADEMIC POSITIONS

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

EDUCATION

DAMTP - University of Cambridge, UK Jesus College, University of Cambridge 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	2020 - 2025 2021 - 2025
School of Physics and Astronomy, Queen Mary University of London, UK 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	2018 - 2019
Emmanuel College, University of Cambridge, UK BA (Hons) in Natural Sciences Rowley Mainhood Prize Senior Exhibitioner Election	2015 - 2018
Whitgift School, Croydon, UK Whitgift Academic Scholarship & Bursary	2007 - 2014

SELECTED AWARDS AND PRIZES

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

SELECTED AWARDS AND PRIZES (cont.)

Institute of Physics (IOP) Bell Burnell Graduate Scholarship (3.5 years) <i>Awarded \sim£40000 for PhD position at University of Cambridge by the UK's Institute of Physics.</i>	Apr. 2021 Cambridge
Cavendish Scholarship (3.5 years) <i>Awarded \sim£90000 for PhD position at University of Cambridge by the Cavendish Trust.</i>	Mar. 2021 Cambridge
de Sitter Fellowship (4 years) [declined] <i>Joint PhD position at Instituut-Lorentz for Theoretical Physics and Leiden Observatory.</i>	Feb. 2021 Netherlands
Delta Institute for Theoretical Physics PhD Visitor Programme <i>6-month PhD visitor programme with Prof. Subodh Patil & Prof. Jan Pieter van der Schaar.</i>	Awarded 2021 (postponed COVID) Netherlands
Visiting Scholar at Institute of Astronomy, Cambridge <i>Visiting scholar's grant to work within the University of Cambridge's cosmology departments.</i>	Sep. 2020 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., Stefanyshyn 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", ([arXiv:2408.17406](#)), accepted for publication in *SciPost*.
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 $T\overline{T} + \Lambda_d$ ", 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 <i>Visiting scholar with Prof. Nima Arkani-Hamed</i>	TBC USA
Brown Theoretical Physics Center Department of Physics, Brown University <i>Visiting scholar with Prof. Stephon Alexander</i>	TBC USA
Department of Theoretical Physics, CERN Department of Theoretical Physics, CERN <i>Scientific Collaborator with Prof. Shota Komatsu and Prof. Timothy Cohen</i>	Aug. 2025 - Present Switzerland

ACADEMIC VISITS (cont.)

Perimeter Institute for Theoretical Physics Perimeter Institute for Theoretical Physics <i>Visiting researcher with Prof. Rober C. Myers and Dr. Joshua Kirklín</i>	Aug. 2025 Canada
Kavli Institute for Theoretical Physics University of California, Santa Barbara <i>KITP Graduate fellow; mentored by Prof. Clifford Johnson and Dr. Mykhaylo Usatyuk</i>	Jan. - Jun. 2025 USA
Center for Computational Astrophysics Flatiron Institute - Simons Foundation <i>Visiting scholar with Dr. Cyril Creque-Sarbinowski</i>	Jun. - Jul. 2024 USA
Stanford Institute for Theoretical Physics Varian Physics Lab Stanford <i>Visiting scholar with Prof. Eva Silverstein & Prof. Leonard Susskind</i>	Feb. - Mar. 2024 USA
Delta Institute for Theoretical Physics Amsterdam & Leiden <i>Visiting scholar with Prof. Daniel Baumann & Prof. Jan Pieter van der Schaar</i>	Postponed COVID Netherlands
University of Cambridge Kavli Institute for Cosmology, Cambridge <i>Visiting scholar's grant to work within the University of Cambridge's cosmology departments</i>	Oct. 2020 - Sep.2021 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	QIQG 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 $T\bar{T} + \Lambda_d$ (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.)

[†] = *Invited talk*

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

Mentoring Flatiron Intern

Aug. 2024 - Present

USA & Online

- 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

Research Project Supervisor (unpaid volunteering and paid work)

Mar. 2023 - Present

Online

- 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.)

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| UniArk
<i>Co-founder and Mentor</i> | Mar. 2021 - Present
<i>UK & Online</i> |
| <ul style="list-style-type: none">· 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
<i>Cambridge, UK</i> |
| <ul style="list-style-type: none">· 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
<i>London, UK</i> |
| <ul style="list-style-type: none">· 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
<i>UK & Online</i> |
| <ul style="list-style-type: none">· 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

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| 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>Panellist 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

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

REFEREES

Prof. A C Wall
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