
Ayngaran Thavanesan

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DAMTP, Wilberforce Road, Cambridge, Cambridgeshire, CB3 0WA, UK (*Work*)

Jesus College, Cambridge, Cambridgeshire, CB5 8BL, UK (*Home*)

EDUCATION

DAMTP - University of Cambridge	2020 - Present
Jesus College, University of Cambridge	2021 - Present
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 wavefunction of the universe at the early and late conformal boundaries (TBC)’	
<i>Thesis advisor:</i> Prof. Aron Wall	
School of Physics and Astronomy, Queen Mary University of London	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. Tim Clifton</i>)	
The Drapers’ Company Prize	
Emmanuel College, University of Cambridge	2015 - 2018
BA (Hons) in Natural Sciences	
Rowley Mainhood Prize	
Senior Exhibitioner Election	
Whitgift School, Croydon	2007 - 2014
Whitgift Academic Scholarship & Bursary	

SELECTED AWARDS AND PRIZES

Kavli Institute for Theoretical Physics Graduate Fellowship	Oct. 2024
<i>6-month fellowship at KITP; mentored by Prof. Clifford Johnson & Dr. Mykhaylo Usatyuk.</i>	USA
Smith-Knight & Rayleigh-Knight Prize	Mar. 2023
<i>Awarded for my outstanding and striking research results by Cambridge Mathematics Department.</i>	Cambridge
Student-Led Teaching Awards (SLTAs)	Mar. 2022
<i>Shortlisted from amongst over 400 nominations for my teaching across Cambridge University.</i>	Cambridge
Jesus College David & Susan Hibbitt Scholarship (3 years) [declined]	Jun. 2021
<i>Awarded £42000 for PhD position at University of Cambridge by Jesus College, Cambridge.</i>	Cambridge
Institute of Physics (IOP) Bell Burnell Graduate Scholarship (3.5 years)	Apr. 2021
<i>Awarded ~£40000 for PhD position at University of Cambridge by the UK’s Institute of Physics.</i>	Cambridge
Cavendish Scholarship (3.5 years)	Mar. 2021
<i>Awarded ~£90000 for PhD position at University of Cambridge by the Cavendish Trust.</i>	Cambridge
de Sitter Fellowship (4 years) [declined]	Feb. 2021
<i>Joint PhD position at Instituut-Lorentz for Theoretical Physics and Leiden Observatory.</i>	Netherlands
Delta Institute for Theoretical Physics PhD Visitor Programme	Awarded 2021 (postponed COVID)
<i>6-month PhD visitor programme with Prof. Subodh Patil & Prof. Jan Pieter van der Schaar.</i>	Netherlands
Visiting Scholar at Institute of Astronomy, Cambridge	Sep. 2020
<i>Visiting scholar’s grant to work within the University of Cambridge’s cosmology departments.</i>	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](#)), submitted to *Physical Review X*.
4. *Goodhew, H., **Thavanesan, A.**, Wall, A.C. "The CPT Theorem for Cosmology", awaiting submission to *Physical Review Letters*.
5. **Thavanesan, A.** "No-go Theorem for Cosmological Parity Violation", ([arXiv:2501.06383](#)), submitted to *Physical Review D*.
6. *Araujo-Regado, G., **Thavanesan, A.**, Wall, A.C. "Holographic Cosmology at Finite Time", in preparation.
7. *Shyam, V., Silverstein, E., Soni, R., **Thavanesan, A.**, Torroba, G. "dS/CFT from $T\overline{T} + \Lambda_d$ ", in preparation.

ACADEMIC VISITS

School of Natural Sciences

Institute for Advanced Study, Princeton

Visiting scholar with Prof. Nima Arkani-Hamed

TBC

USA

Brown Theoretical Physics Center

Department of Physics, Brown University

Visiting scholar with Prof. Stephon Alexander

TBC

USA

Department of Department of Theoretical Physics, CERN

Department of Department of Theoretical Physics, CERN

Visiting researcher with Prof. Shota Komatsu

TBC

Switzerland

Kavli Institute for Theoretical Physics

University of California, Santa Barbara

KITP Graduate fellow; mentored by Prof. Clifford Johnson and Dr. Mykhaylo Usatyuk

Jan. - Jun. 2025

USA

Center for Computational Astrophysics

Flatiron Institute - Simons Foundation

Visiting scholar with Dr. Cyril Creque-Sarbinowski

Jun. - Jul. 2024

USA

Stanford Institute for Theoretical Physics

Varian Physics Lab Stanford

Visiting scholar with Prof. Eva Silverstein & Prof. Leonard Susskind

Feb. - Mar. 2024

USA

Delta Institute for Theoretical Physics

Amsterdam & Leiden

Visiting scholar with Prof. Daniel Baumann & Prof. Jan Pieter van der Schaar

Postponed COVID

Netherlands

University of Cambridge

Kavli Institute for Cosmology, Cambridge

Visiting scholar's grant to work within the University of Cambridge's cosmology departments

Oct. 2020 - Sep. 2021

Cambridge, UK

TALKS - ACADEMIC & PUBLIC

[†] = *Invited talk*

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

TALKS - ACADEMIC & PUBLIC (cont.)

Dec. 2022	YTF 22 <i>On Graviton non-Gaussianities in the Effective Field Theory of Inflation</i> (30 mins)
†Nov. 2022	Manchester Cosmology Seminar <i>On Graviton non-Gaussianities in the Effective Field Theory of Inflation</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

Mentoring Flatiron Intern

Aug. 2024 - Present

USA & Online

- Supervising undergraduate ([Ezra Msolla](#)) from underrepresented background with interests in cosmology.
- Ezra's research project studies mechanisms to circumvent the no-go theorem for parity violation in cosmology.

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.

MENTORING & TEACHING (cont.)

- UniArk** Mar. 2021 - Present
Co-founder and Mentor 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)** Oct. 2020 - Present
Examples Class Lecturer/Demonstrator & Supervisor (small group tutor) 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** Sep. 2018 - Jan. 2019
Outreach Worker with Prof. Richard Nelson 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** Jul. 2010 - Present
Tutor 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** Co-organised [Quantum de Sitter Universe](#) 1-week workshop held in April 2023.
Co-organised DAMTP High Energy Physics & General Relativity Journal Club.
- Referee** Wrote references for multiple students for PhD applications all of whom were successful in securing PhD positions within DAMTP, Cambridge and externally.
- Equality & Diversity** **King's Birthday Honours 2024 OBE nomination for Prof. Anne-Christine Davis**
Wrote successful [King's Birthday 2024 honours nomination](#). for [Prof. Anne-Christine Davis](#).
Snapshots of Research 2024 speaker
[Event](#) aimed at undergraduate and Masters students to promote diversity in mathematics.
Promoting equality in the Physics & Astronomy community
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.
Promoting equality at the University of Cambridge
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.
Co-organiser of Cambridge DAMTP Racism Discussion Group
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.
- Outreach** **Organiser and speaker at 2021 Cambridge Science Festival**
Organised a series of [five talks](#) on the recent progress of the black hole information paradox.
- 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^AT_EX, MATLAB, CLASS, CAMB, [UltraNest](#), healpy, Gnuplot, [anesthetic](#)
- Languages** English (Native), Tamil (Mother tongue), German (Professional), French (Basic)

REFEREES

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|--|--|---|--|
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(PhD Supervisor)
DAMTP, Cambridge
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