

Seshadri Nadathur

Institute of Cosmology and Gravitation
University of Portsmouth
Portsmouth PO1 3FX, United Kingdom

Email: seshadri.nadathur@port.ac.uk
Tel.: +44 23 9284 3117
<https://seshnadathur.github.io/>
ORCID: [0000-0001-9070-3102](https://orcid.org/0000-0001-9070-3102)

RESEARCH INTERESTS

I am an observational cosmologist: I study the large-scale structure of the Universe and use this to learn about fundamental physics. Areas of expertise include:

- Galaxy redshift surveys and data analysis
- Galaxy clustering, BAO and RSD
- Lyman-alpha forest clustering
- Dark energy and gravity
- Neutrino cosmology
- Cosmological voids and novel probes
- Cosmic microwave background

ACADEMIC POSITIONS

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| Associate Professor | University of Portsmouth | 2024 – |
| Senior Research Fellow and Senior Lecturer | University of Portsmouth | 2022 – 2024 |
| Senior Research Fellow | University College London | 2021 – 2021 |
| Research Fellow | University of Portsmouth | 2015 – 2020 |
| Postdoctoral research fellow | University of Helsinki | 2013 – 2015 |
| Postdoctoral research fellow | University of Bielefeld | 2011 – 2013 |
| Lecturer in Physics | Trinity College, University of Oxford | 2007 – 2011 |

QUALIFICATIONS

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| DPhil, Theoretical Physics <i>Clarendon Scholarship</i> | University of Oxford | 2007 – 2011 |
| MPhys Physics (<i>1st class</i>) <i>Rhodes Scholarship</i> | University of Oxford | 2005 – 2007 |
| BSc Hons Physics (<i>1st class</i>) | University of Delhi | 2002 – 2005 |

GRANTS AND AWARDS

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| 2025 | UK Space Agency Euclid grant (co-PI, £110K) |
| 2023 | University of Portsmouth NARF award (PI, £5K) |
| 2022–25 | UK Space Agency Euclid grant (co-PI, £712K) |
| 2021–25 | STFC Ernest Rutherford Fellowship (PI, £528K) |
| 2015–18 | Dennis Sciama Postdoctoral Fellowship |
| 2015–17 | Marie-Sklodowska Curie Individual Fellowship (PI, €183K) |
| 2011 | Vice-Chancellor’s Award, University of Oxford |
| 2007–10 | Clarendon Scholarship , University of Oxford (approx. £40K) |
| 2005–07 | Rhodes Scholarship , University of Oxford (approx. £40K) |
| 2006 | Millard Scholarship, Trinity College |

COLLABORATION LEADERSHIP

Dark Energy Spectroscopic Instrument (DESI):

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|-------|--|
| 2025 | Awarded Builder status “ for outstanding leadership and coordination of the galaxy and quasar clustering analysis ” |
| 2022– | Co-chair of Galaxy and Quasar Clustering (GQC) working group: Leading largest working group in the collaboration (over 200 people); leading and coordinating main DESI science analyses for Data Releases 1 and 2 (~30 papers so far); additionally coordinating over 80 individual projects within the working group |
| 2022– | Member, DESI Science Committee Member of leadership group reporting to DESI Spokespersons and planning overall science direction of the collaboration |

Euclid Consortium:

- 2024– Co-lead, Key Project KP-GC-4:
Leading key project on measurement of baryon acoustic oscillations in DR1
- 2018– **Lead of LE3 Internal Data**
Leading Science Ground Segment (SGS) work package for spectroscopic internal data processing and associated key project; co-PI for multiple UKSA grants funding UK contributions to Euclid SGS. This is a key UK responsibility, deliverable to the European Space Agency.
- 2020–24 Co-lead, Voids work package:
Led team within the galaxy clustering Science Working Group working on cosmic void analyses

PROFESSIONAL
SERVICE**Grant reviews:**

- Member of STFC Ernest Rutherford Fellowship Sift Panel (2024–present)
Expert reviewer for Royal Society (UK), STFC Astronomy Grants Panel (UK), Swiss National Science Foundation (Switzerland), Agence Nationale de la Recherche (France), National Science Centre (Poland)

Examinations:

- PhD examiner for Ryan Turner (Swinburne, 2023), Bartolomeo Fiorini (Portsmouth, 2022)
External Censor, FYS110 Physics examination at University of Stavanger, 2020
MSc examiner for A.-S. Balleier (Bielefeld, 2013), B. Kalus (Bielefeld, 2012)
BSc examiner for P. Niksa (Bielefeld, 2012)

Journal reviews:

- Regular reviewer for Phys. Rev. D, JCAP, Astrophysical Journal, MNRAS, Open Journal of Astrophysics, European Physics Journal C, Astrophysics & Space Science

Conference and workshop organisation:

- 2017– Scientific Organising Committee for 4 editions of the *Understanding Cosmological Observations* biennial workshop series in Benasque, Spain
2022–24 Scientific Organising Committee for annual Euclid joint GC-SWG and SGS meetings
2020 Scientific Organising Committee, Euclid:UK meeting

Institutional service:

- Fellowship selection panel, ICG Portsmouth (2024)
Chair of Computing Committee, ICG Portsmouth (2024–)
PhD Admissions Committee, ICG Portsmouth (2022–2024)
EDI Committee, ICG Portsmouth (2022–24)
DESI Speakers Board (2020–22)

RESEARCH
SUPERVISION**Postdocs/research software engineers:**

- Ricardo Landim (2024–), Christopher Pattison (2022–), Samantha Youles (2022–), Coleman Krawczyk (2022–24), Lucia Fonseca de la Bella (2021–22)

PhD students as primary/joint primary supervisor:

- Nathan Findlay (Portsmouth, 2022–), Umut Demirbozan (Barcelona, 2023–25), Slađana Radinović (Oslo, 2019–24), Alex Woodfinden (Waterloo, 2019–23)

PhD students as secondary supervisor:

- Neel Shah (Portsmouth, 2023–), Tristan Fraser (Waterloo, 2020–)

Additional project supervision of PhD students:

Rafaela Gsponer (Portsmouth, 2023–24) and Ruiyang Zhao (Beijing/Portsmouth, 2023–24), both on DESI cosmology analyses; Paul Carter (Portsmouth, 2018–19); Mikko Lavinto (Helsinki, 2014–15); Samuel Flender (Helsinki 2012–13)

Undergraduate research projects:

Virginia d’Emilio (Portsmouth/SEPnet, 2017)

INVITED TALKS

I am regularly invited to give talks about my research. The following selected list is of scheduled or completed talks in the last 24 months:

Seminars and colloquia: University College London, KITP Karlsruhe, University of Sussex, INFN Torino, University of Helsinki, University of Geneva, LAPTH Annecy, DESY Hamburg, University of Edinburgh, University of Manchester

Conference talks:

- Plenary speaker, Euclid joint GC-SWG and SGS meeting, Garching, Jan 2025
- Plenary speaker, DESI Collaboration meeting, Cancun, Dec 2024
- Plenary speaker, Euclid Consortium Meeting, Rome, June 2024
- Plenary speaker, Frontiers in Cosmology and Gravitational Physics, Portsmouth. May 2024
- Invited panellist, Cosmological constraints from Baryon Acoustic Oscillations, online. April 2024
- Invited speaker, 58th Rencontres de Moriond (Cosmology), Italy, March 2024
- Plenary speaker, Cosmology From Home, online, June 2023

MEDIA AND
OUTREACH

Selected media coverage:

“[Is dark energy getting weaker? Fresh data bolster shock finding](#)” (Nature, 2025)

“[Mystery force behind the universe’s accelerating expansion may not be so constant after all](#)” (Science, 2025)

“[Dark Energy Experiment challenges Einstein’s theory of Universe](#)” (BBC News, 2025)

“[Is Dark Energy Getting Weaker? New Evidence Strengthens the Case.](#)” (Quanta, 2025)

“[Shocking Dark Energy Findings Challenge the Standard Model of the Universe](#)” (Scientific American, 2025)

“[2024’s Biggest Breakthroughs in Physics](#)” (Quanta, 2024)

“[TIME Best Inventions of 2024: DESI 3D Map of the Universe](#)” (TIME, 2024)

“[New 3D cosmic map raises questions over future of universe, scientists say](#)” (The Guardian, 2024)

“[Dark Energy May Be Weakening, Major Astrophysics Study Finds](#)” (Quanta, 2024)

“[Cosmologists Parry Attacks on the Vaunted Cosmological Principle](#)” (Quanta, 2022)

“[New Dark Energy Data Emerges from Misshapen, Distorted, Ancient Voids](#)” (Live Science, 2019)

“[Biggest map of giant voids and clusters in the universe solves major cosmological puzzle](#)” (The Conversation, 2016)

TV:

Appeared on [Hannah Fry’s Mysterious World of Maths](#), BBC4 and Open University (2018)

Radio:

Interviewed for BBC Radio Solent ([2025](#) and 2018), The Star Spot podcast (Toronto, 2019)

Public lectures/talks:

Stargazing Portsmouth (2025)

Winchester Café Scientifique (2023)
 Hampshire Astronomy Group (2019)
 Winchester Science Festival (2017)
 Stargazing Portsmouth (2016–18)

TEACHING

Graduate teaching:

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| Invited lecturer, <i>Bayesian Methods for Galaxy Clustering</i> | Les Houches Advanced Euclid School | 2020 |
| PhD lecture course, <i>MCMC techniques in cosmology</i> | ICG Portsmouth | 2019 |
| Core PhD lecture course, <i>Observational Cosmology</i> | ICG Portsmouth | 2017 – 2019 |
| PhD lecture course, <i>Statistical Methods for Cosmic Structure Formation</i> | ICG Portsmouth | 2017 |

Undergraduate teaching:

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|--|--|-------------|
| Invited lecturer, University of Helsinki summer school Lectures on <i>Large-scale structure</i> | | 2015 |
| Lecturer in Physics, Trinity College, Oxford Tutorial teaching for 1 st year physics undergraduates, college examinations and assessments, admissions interviews. Topics taught: <i>Mathematical Methods 1 & 2, Waves, Optics</i> | | 2007 – 2011 |

MENTORSHIP

I provided extensive guidance and mentorship for several early career researchers applying for research fellowships and starting their first faculty positions, including Pedro Carrilho (Hertfordshire), Vid Irsic (Hertfordshire), Shahab Joudaki (Madrid), Eva-Maria Mueller (Sussex), Miguel Zumalacarregui (Berkeley) and Wojciech Hellwing (Warsaw).

Faculty mentor at Portsmouth for Mark Magee (2022) and Sai Srinivas (2024–).

PUBLICATIONS

I have co-authored over 180 papers, with over 12,000 citations as of April 2025; for a full list see this NASA/ADS [link](#). My h-index is 48 (i.e., 48 papers with >48 citations each). A list of papers to which I made major contributions (as first-tier author or better) is [here](#).

Selected key publications:

1. DESI COLLABORATION, M. Abdul-Karim, J. Aguilar, *et al.*, “DESI DR2 Results II: Measurements of Baryon Acoustic Oscillations and Cosmological Constraints”, 2025, submitted to Phys. Rev. D, [arXiv:2503.14738](#)
I was coordinating author for this paper, led the analysis team and the science interpretation, and wrote and edited the manuscript.
2. DESI COLLABORATION, A. G. Adame, J. Aguilar, *et al.*, “DESI 2024 VI: cosmological constraints from the measurements of baryon acoustic oscillations”, 2025, JCAP 2025, 02, [arXiv:2404.03002](#)
I was part of the lead authorship group (of 5) for this paper, ran the data analyses and science interpretation, and wrote and edited the manuscript.
3. A. Cuceu, A. Font-Ribera, S. Nadathur, B. Joachimi, P. Martini, “Constraints on the Cosmic Expansion Rate at Redshift 2.3 from the Lyman- α Forest”, 2023, Phys. Rev. Lett., 130, 191003, [arXiv:2209.13942](#)
4. S. Nadathur, W. J. Percival, F. Beutler, H. A. Winther, “Testing Low-Redshift Cosmic Acceleration with Large-Scale Structure”, 2020, Phys. Rev. Lett., 124, 221301, [arXiv:2001.11044](#)

5. S. Nadathur, P. M. Carter, W. J. Percival, H. A. Winther, J. A. Bautista, “Beyond BAO: Improving cosmological constraints from BOSS data with measurement of the void-galaxy cross-correlation”, 2019, Phys. Rev. D, 100, 023504, [arXiv:1904.01030](https://arxiv.org/abs/1904.01030)