# Tomáš Šoltinský

## Curriculum Vitae

202<u>3-</u>24

2019-23

2014-19

2016-17

2018-19

2018

2018

2017-18

2017

2017

Via Giambattista Tiepolo, 11, 34131 Trieste, Italy Nationality: Slovak

 $\square$  +421 915840400

**☑** tomas.soltinsky@inaf.it **⑤** tomassoltinsky.github.io

lace

Employment

**Postdoctoral Research Grant Holder**, National Institute of Astrophysics - Astronomical Observatory of Trieste, Trieste, Italy

**Postdoctoral Research Fellow**, *Tata Institute of Fundamental Research*, Mumbai, India Department of Theoretical Physics

Education

PhD in Physics, University of Nottingham, Nottingham, UK

Supervisors: Dr James S Bolton, Dr Nina Hatch

Thesis: Simulating neutral hydrogen across cosmic time: the 21-cm forest in late reionization models and the global 21-cm signal at cosmic dawn

O Vice-Chancellor's Scholarship for Research Excellence

Graduated July 2023

MPhys in Physics, Astrophysics, The University of Edinburgh, Edinburgh, UK

O Graduated July 2019 with the First Class

Exchange program, California Institute of Technology, Pasadena, USA

O GPA: 3.3

2025

2023-24

Technical and Academic Experience

Refereeing scientific papers, for A&A In-Kind Directable Software Development for the LSST-DESC, Tata Institute of Fundamental Research, Mumbai, India

O Development of a code for calculating 3D trispectrum from N-body simulations

MPhys Project, The University of Edinburgh, Edinburgh, UK

Extreme Variability of Active Galactic Nuclei (report)

Supervisor: Prof Andy Lawrence

O Tested black hole accretion disc models in the context of extreme variability of AGN luminosity

Included a public summary (created a card game)

Cormack Vacation Research Scholarship and Deans' Vacation Scholarship, The Institute

for Astronomy, Edinburgh, UK

21cm Signal Marking the End of Dark Ages (report, poster)

Supervisor: Dr José Oñorbe

O Mock observations of global 21cm signal with focus on Dark Ages based on Nyx simulations

**Senior Honours Project**, *The University of Edinburgh*, Edinburgh, UK

Scalar Field Dark Energy Supervisor: Prof Andy Taylor

O Simulated the expansion of the universe driven by dark energy modeled as a dynamical scalar field

Telescope Group Project, The University of Edinburgh, Edinburgh, UK

Measurement of the Characterising Properties of Exoplanet TrES-2b and its Host Star Supervisor: Prof Philip Best

O Transit Photometry and Doppler Spectroscopy methods

Observations performed with Edinburgh University's Meade MAX 20in ACF telescope

**Summer Undergraduate Research Fellowship**, Caltech, Pasadena, USA

Redefining the Habitable Zone

Supervisor: Prof David J. Stevenson

O Determining conditions under which water in liquid phase can be present on the surface of a planet

Research in Experimental Physics, Caltech, LIGO, Pasadena, USA

Signal Processing

Supervisor: Dr Thomas J. Massinger

Data analysis and investigation of glitches in data

#### **Publications**

S K Patil, **T Šoltinský**, S Maitra, et al., "Efficient neutral-IGM inference from noisy 21-cm forest spectra with latent-space U-Net encoding and XGBoost", submitted to *MNRAS*, eprint arXiv:2507.11611, 2025. (link)

**T Šoltinský**, G Kulkarni, S P Tendulkar, et al., "Prospects of a statistical detection of the 21-cm forest and its potential to constrain the thermal state of the neutral IGM during reionization", published in *MNRAS*, Volume 537, Issue 1, pp.364-378, 2025. (link)

E Puchwein, J S Bolton, L C Keating, et al. "The Sherwood-Relics simulations: overview and impact of patchy reionization and pressure smoothing on the intergalactic medium", published in *MNRAS*, Volume 519, Issue 4, pp.6162-6183, 2023. (link)

**T Šoltinský**, J S Bolton, M Molaro, et al. "Probing quasar lifetimes with proximate 21-centimetre absorption in the diffuse intergalactic medium at redshifts  $z \ge 6$ ", published in *MNRAS*, Volume 519, Issue 2, pp.3027-3045, 2023. (link)

**T Šoltinský**, J S Bolton, N Hatch, et al. "The detectability of strong 21-cm forest absorbers from the diffuse intergalactic medium in late reionization models", published in *MNRAS*, Volume 506, pp. 5818-5835, 2021. (link)

C S Cockell, "Astrobiology: Understanding Life in the Universe", Wiley-Blackwell, 2015

O Contributed to and was cited in the Preface to the book

#### Awards, Scholarship, Grants

Vice Chancellor's Scholarship for Research Excellence (EU), University of Nottingham, Nottingham, UK

To support my PhD studies

2019-22

2019

2018

2016

2014

2014

Students into the World grant, The Tatra banka Foundation, Slovakia

**RSE Cormack Undergraduate Astronomy Research Prize**, *Royal Society of Edinburgh*, Edinburgh, UK

For the "21cm Marking the End of Dark Ages" project

Year 2 Physics Class medal, The University of Edinburgh, Edinburgh, UK

For excellent performance during the 2015/16 session

The memorial letter of St. Gorazd, The Ministry of Education, Science, Research and Sport of the Slovak Republic, Bratislava, Slovakia

For successful representation of the Slovak Republic at Austrian Young Physicists' Tournament and achievement of bronze medal

**Best in Natural Sciences school award**, *Pavol Horov Gymnasium*, Michalovce, Slovakia For representation of the school at various Physics and Maths competitions

#### Software

2024

2021

2023

202<u>3-</u>24

2016

21cm-forest\_1DPS repository, https://github.com/tomassoltinsky/21cm-forest\_1DPS

Forward-modelling the 21-cm forest with instrumental features and compute its 1D power spectrum Used in 2 publications

#### Mentoring and Teaching

Mentoring at GROWNi.sk, Slovakia

Advising students in their career and study decisions

o "From LA through half the globe to simulated universe", Topic: career path and simulations in astrophysics

O "From LA to LA", Topic: gained experience and how to study abroad

Outreach talks, Pavol Horov Gymnasium, Michalovce, Slovakia

 $\circ$  "Science has no borders", Topic: my research experience and ongoing research in the world

Advanced 21-cm Cosmology School and Workshop, National Institute of Science Education and Research, Bhubaneswar, India, Lectures (link)

### Service to Research Community

**State of the Universe Seminar Series Organizer**, *Tata Institute of Fundamental Research*, Mumbai, India

2022	Astronomy Postgraduate Student Representative, The University of Nottingham, Nottingham, UK  O Main point of communication between PG students and staff
202 <u>1-</u> 22	Lunch Talks Organizer, The University of Nottingham, Nottingham, UK
2019-22	Physics Coursework Marker, The University of Nottingham, Nottingham, UK
2017-21	Student Ambassador, The University of Edinburgh and the University of Nottingham, Edinburgh
	and Nottingham, UK
	O Resided over the information desk and gave tours of the campus and the School of Physics and Astronomy
2018	at the Open Days, Post-offer Visit Days, Visiting Students Welcome Event  UUKi Parliamentary Reception for the Go International: Stand Out Campaign,
	Westminster, London, UK
	Ambassador for The University of Edinburgh
	Membership in collaborations
2024	SKA Cosmology and Epoch of Reionization SWGs, link Cosmology, link EoR
2024	21-cm Cosmology Group (India), link
2023	LSST-DESC, Large scale structure WG, provisional membership, link
2019	Sherwood-Relics simulation suite, link
	Presentations at International Conferences and Meetings
2025	Kaba Kada: Exploring the first billion years of the Universe, Oaks Port Douglas Resort, Port
2025	Douglas, Queensland, Invited talk and part of panel
2025	ICRAR-Curtin Colloquium, Curtin University, Perth, Western Australia, Colloquium
•	<b>National Astronomical Meeting (NAM2025)</b> , <i>Durham University</i> , Durham, UK, Talk and a poster at 2 sessions
2025	
2025	Universe, Trieste, Italy, Talk
2025	Radio Cosmology and Continuum Observations in the SKA Era: A Synergic View,
2024	International Centre for Theoretical Sciences, Bengaluru, India, Talk (link)
2024	SKA Cosmology SWG Meeting, Observatoire de la Cote d'Azur, Nice, France, Talk
2024	<b>IFPU colloquium</b> , <i>Institute for Fundamental Physics of the Universe</i> , Trieste, Italy, Colloquium  The First Circurat(s), Hile Hausian Hotel, Hile Hausian Tolk
2024	The First Gigayear(s), Hilo Hawaiian Hotel, Hilo, Hawai'i, Talk  The Origin and Evolution of Supermassive Black Holes, Sexten Center for Astrophysics,
•	Sexten, Italy, Talk (link 1,link 2)
2024	Cosmic Dawn at High Latitudes Conference, Royal Swedish Academy of Sciences, Stockholm,
2024	Sweden, Talk (link)
2024	State of the Universe, Tata Institute of Fundamental Research, Mumbai, India, Seminar (link)
2024	Cosmology in the Alps Conference, Les Diablerets, Switzerland, Talk (link)
•	<b>Monday Afternoon Talks</b> , MIT Kavli Institute for Astrophysics and Space Research, Cambridge, US, Talk
2024	Pune-Mumbai Cosmology and Astro-Particle meeting, The Inter-University Centre for As-
2024	tronomy and Astrophysics, Pune, India, Talk and Chaired a session (link)
2024	Astronomical Society of India meeting, Indian Institute of Science, Bengaluru, India, Talk
2023	HEA group meeting, Masaryk University, Brno, Czechia, Seminar
2023	Astrophysics Seminar, University of Helsinki, Helsinki, Finland, Seminar
2023	Galaxy coffee, Max Planck Institute for Astronomy, Heidelberg, Germany, Talk
2023	21-cm Series Seminar, University of Cambridge, Cambridge, UK, Seminar
2022	Colloquium, National Centre for Radio Astrophysics, Pune, India, Colloquium
•	Lunch talk, The University of Nottingham, Nottingham, UK, Talk

2022 21-cm Series Seminar, University of Cambridge, Cambridge, UK, Seminar 2021 State of the Universe, Tata Institute of Fundamental Research, Mumbai, India, Seminar (link) 2021 National Astronomical Meeting (NAM2021), The University of Bath, Bath, UK, Talk 2021 **SAZERAC 2.0**, Recorded talk (link) 2021 Lunch talk, The University of Nottingham, Nottingham, UK, Talk 2020 Lunch talk, The University of Nottingham, Nottingham, UK, Talk **Training** 2023 Foundation HPC-Skills Course, DiRAC 2023 DP0 Virtual Summer School 2023, Vera C. Rubin Observatory/LSST Skills

Programming Python, Jupyter notebook, C, LATEX, Mathematica, basic in IDL Radiative Transfer, 21cmFAST, IRAF, SExtractor Large data analysis (binary and HDF5 formats), MCMC, OpenMP parallelisation, Slurm