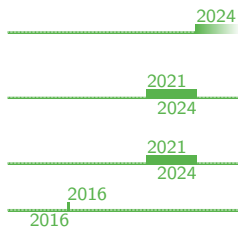


Office 240, Slovanka Building
 Institute of Physics of the Czech Academy of Sciences
 Na Slovance 1999/2, 182 00 Prague 8, Czech Republic
 +420 7761 43809
 barker@fzu.cz
 www.wevbarker.co.uk
 wevbarker
 0000-0002-1501-3221

Dr. Will Barker

Employment



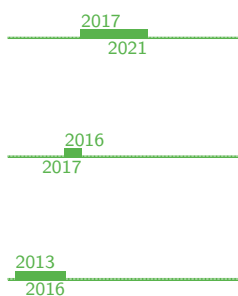
Physics For Future Fellow, Central European Institute for Cosmology and Fundamental Physics, Division of Elementary Particle Physics, Institute of Physics of the Czech Academy of Sciences

Rosamund Chambers Junior Research Fellow in Astrophysics, Girton College, Cambridge, Cavendish Laboratory Astrophysics Group, Kavli Institute for Cosmology, Cambridge

College Lecturer in Astrophysics (concurrently with JRF), Girton College, Cambridge

Summer internship, Institute of Astronomy, • Prof. D. Lynden-Bell • Prof. J. Bičák

Education



Ph.D. Theoretical Physics: "Gauge theories of gravity", Wolfson College, Cambridge, Cavendish Laboratory Astrophysics Group, Kavli Institute for Cosmology, Cambridge

➤ Advisors: • Prof. A. N. Lasenby (principal) • Prof. M. P. Hobson (co-) • Dr. W. J. Handley (co-)
 ➤ Examiners: • Prof. A. D. Challinor (internal) • Dr. T. Złóśnik (external)

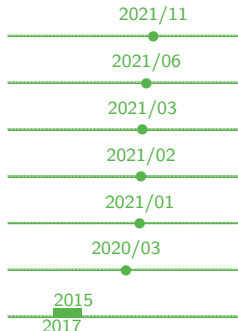
M.Sc. Master of Natural Sciences (First Class), Queens' College, Cambridge

➤ NST Part III (fourth-year) courses: • Quantum field theory • Gauge field theory • Particle physics • Relativistic astrophysics & cosmology • Formation of structure in the universe • General physics
 ➤ Dissertation: "Pushing electrons in one dimension" • Hartree-Fock evolution of fermionic fluid in quenched, one-dimensional systems, implemented in C++ • Prof. E. Artacho

BA Bachelor of Arts (First Class), Queens' College, Cambridge

➤ NST Part II (third-year) courses: • Theoretical physics 1 & 2 • Relativity • Thermal & statistical physics • Advanced quantum physics • Optics & electrodynamics • Astrophysical fluid dynamics • Particle & nuclear physics • Quantum condensed matter physics • Research review of the eigenstate thermalisation hypothesis with Prof. U. Schneider
 ➤ NST Part IB (second-year) courses: • Mathematics • Physics A • Physics B
 ➤ NST Part IA (first-year) courses: • Mathematics • Physics • Materials science • Earth science

Awards and funding



2021 Abdus Salam Prize in Theoretical Physics, best Ph.D. publication

Secured €1,800 funding, Delta ITP Ph.D. visitor program

University of Arizona Postdoctoral Fellowship (3 years), declined

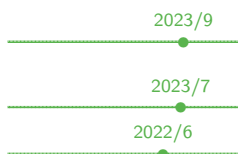
Vaidya-Raychaudhuri Postdoctoral Fellowship (3 years), declined

KIAA Postdoctoral Fellowship (3 years), declined

Secured ¥400,000 funding, collaboration at Iwate University, cancelled by pandemic

Queens' College Cambridge Foundation Scholarship, for high exam performance

Published software (click github.com/wevbarker)



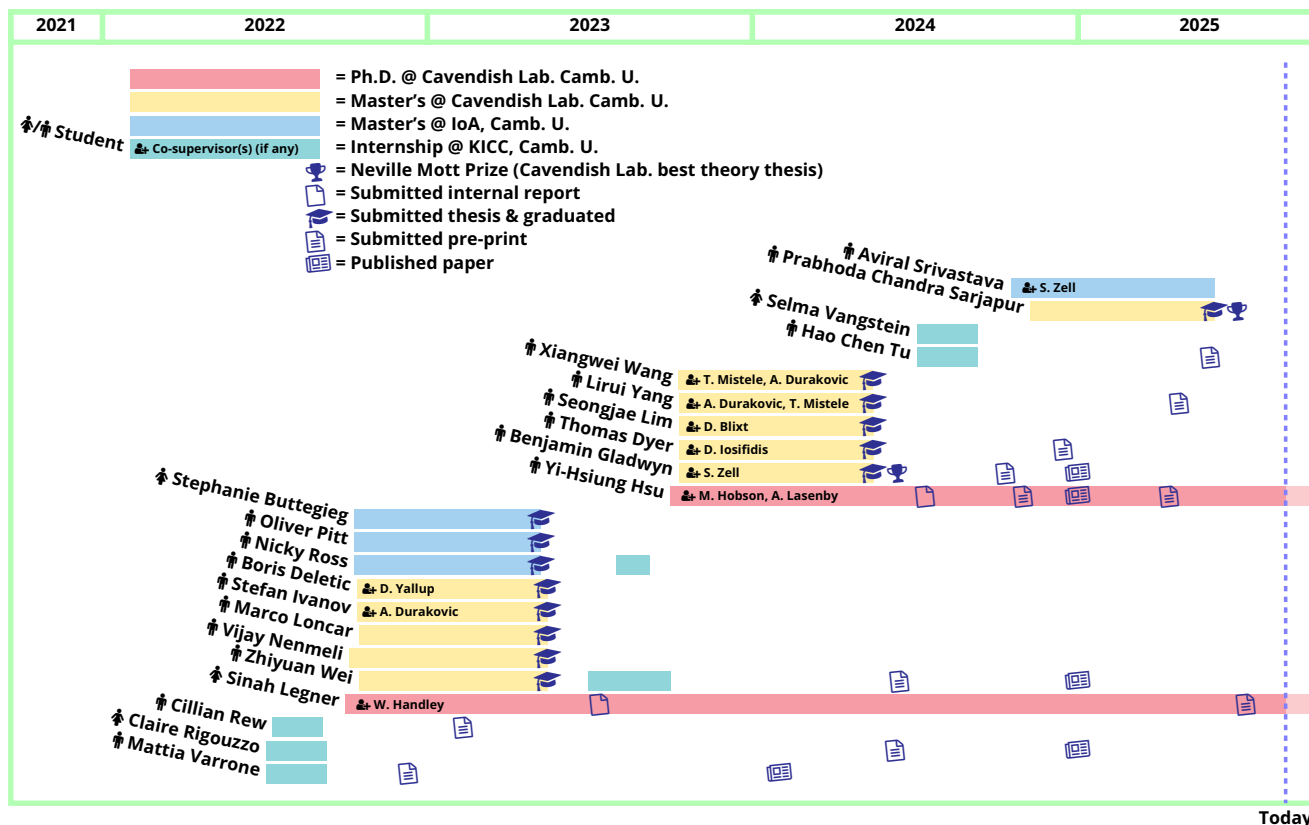
PSALTer: Particle Spectrum for Any Tensor Lagrangian, Predicting the propagating quantum particle states in any tensorial field theory, including for gravity

xPlain, Formatting of unambiguous, lasting derivations in the Wolfram Language

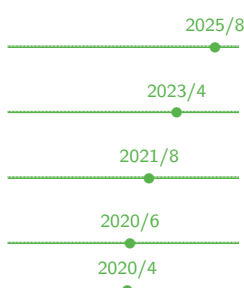
HiGGS: Hamiltonian Gauge Gravity Surveyor, Tools for Hamiltonian constraint, canonical and Dirac-Bergmann analysis of gravity theories with spacetime curvature and torsion

Research supervision (click wevbarker.co.uk/graduate)

My portfolio of solo- and co-supervised research students is presented below. Master's mini-theses at Cambridge typically account for one third of one academic year's credits, and culminate in a 10-20 page pre-print-style report which is internally assessed. I have been permitted to continue supervising remotely since leaving Cambridge in 2024.



Press and media



From Cambridge to Prague, and Beyond Einstein: Will Barker's Quest for a New Gravity, FZU CAS (Institute of Physics)

Deur Gravitational self-interaction Doesn't Explain Galaxy Rotation Curves, lengthy public discussion of our work on Physics Forums

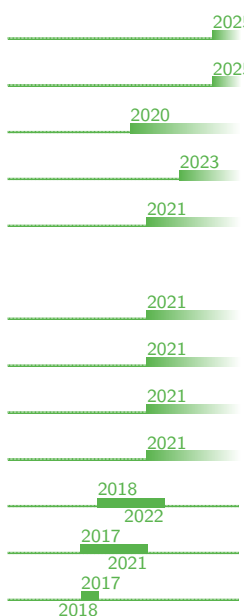
Constructing an alternative to general relativity: torsion and curvature squared?, KICC annual report 2020

Top arXiv papers from week 24, 2020, His Dark CMBlog

Why is the Universe expanding so fast?, Quanta Magazine, featured alongside work by Lisa Randall and Marc Kamionkowski

Academic service, teaching and outreach

Peer Review



IOP Journal of Cosmology and Astroparticle Physics (Impact Factor 5.9)

APS Physical Review D (Impact Factor 5.3)

Elsevier Physics of the dark universe (Impact Factor 4.5)

MDPI Universe (Impact Factor 2.9)

Springer Advances in applied Clifford algebras (Impact Factor 1.1)

Undergraduate teaching (see wevbarker.co.uk/undergraduate)

2nd-year Oscillations, waves and optics (50 hours)

2nd-year Quantum physics (50 hours)

2nd-year Condensed matter physics (50 hours)

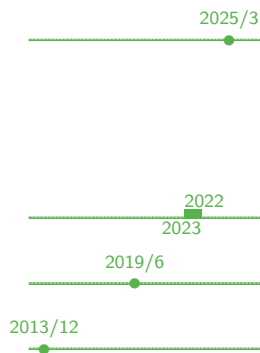
2nd-year Experimental methods (25 hours)

4th-year Relativistic astrophysics and cosmology (30 hours)

3rd-year Relativity (70 hours)

1st-year Mathematics B (100 hours)

Outreach



Educational tour of Chinese high schools, *Five schools across Guangdong and Shandong provinces*, Delivered lectures on “Western academia: admissions and experience” and workshops on Cambridge University interview techniques to over 500 students. Schools visited: • Longcheng High School (Shenzhen) • Guangdong Country Garden School (Foshan) • Shenzhen Concord College of Sino-Canada (Shenzhen) • The Bay International College (Shenzhen) • Shandong Experimental High School (Jinan)

STEM-SMART widening participation programme, *University of Cambridge*, Mathematics teaching for high school students from under-represented backgrounds

REACH Summer School Astronomy and Astrophysics (40 hours), *Anglia Ruskin University and University of Cambridge*, Introduction to general relativity for highschool students

Academic Life, *Truro and Penwith College*, Presentation on university life for highschool students

Computing

Operating systems • Arch GNU/Linux • Manjaro GNU/Linux • CentOS GNU/Linux • Ubuntu GNU/Linux
 Languages • Wolfram Language • Maple • T_EX • TikZ • Python • C++ • Bash • HTML
 Tools • Mathematica • xAct • Git • Vi/Vim • tmux • Jupyter • SLURM • environment modules

References

Prof. Syksy Räsänen

Department of Physics
 University of Helsinki
 Helsinki, Finland
 ✉ syksy.rasanen@helsinki.fi
 ☎ +358-(0)2941-51012
(Research collaborator)

Prof. Mike Hobson

Cavendish Astrophysics Group
 University of Cambridge
 Cambridge, UK
 ✉ mph@mrao.cam.ac.uk
 ☎ +44-(0)1223-339992
(Research collaborator)

Prof. Jiří Bičák

Institute of Theoretical Physics
 Charles University
 V Holešovickách 2
 180 00 Praha 8, Czech Republic
 ✉ bicak.troja@gmail.com
 ☎ +420-(0)221-912-499
(Research collaborator)

Prof. Eugene Terentjev

Cavendish Biological and Soft Systems Group
 University of Cambridge
 Cambridge, UK
 ✉ emt1000@cam.ac.uk
 ☎ +44-(0)1223-337003
(Undergraduate supervisor)

Prof. Anthony Lasenby

Cavendish Astrophysics Group, KICC
 University of Cambridge
 Cambridge, UK
 ✉ a.n.lasenby@mrao.cam.ac.uk
 ☎ +44-(0)1223-337293
(Ph.D. supervisor)

Dr. Will Handley

Cavendish Astrophysics Group, KICC
 University of Cambridge
 Cambridge, UK
 ✉ wh260@cam.ac.uk
 ☎ +44-(0)7718-622713
(Research collaborator)

Prof. Emilio Artacho

Cavendish Theory of Condensed Matter Group
 University of Cambridge
 Cambridge, UK
 ✉ ea245@cam.ac.uk
 ☎ +44-(0)1223-337461
(Master's thesis advisor)

Dr. Morag Hunter

Department of Earth Sciences
 University of Cambridge
 Cambridge, UK
 ✉ mah1003@cam.ac.uk
 ☎ +44-(0)1223-338999
(Teaching assessor)