

# Harry Desmond

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CONTACT INFORMATION	Institute for Cosmology and Gravitation University of Portsmouth Dennis Sciamia Building Portsmouth PO1 3FX, UK	<i>Email:</i> harry.desmond@port.ac.uk <i>Web:</i> <a href="#">University of Portsmouth</a> <i>Citizenship:</i> Dual UK/USA <i>Date of birth:</i> 9 November 1990
RESEARCH INTERESTS	Astrophysical tests of fundamental physics, galaxy dynamics & phenomenology: modified gravity, dark matter, galaxy scaling relations, empirical and statistical methods for the galaxy–halo connection, cosmological N-body and hydrodynamical simulations, stellar structure and evolution	
EMPLOYMENT	<b>Royal Society University Research Fellow</b> Institute for Cosmology and Gravitation, University of Portsmouth	01/2022 –
	<b>McWilliams Fellow</b> McWilliams Center for Cosmology, Carnegie Mellon University	10/2021 – 12/2021
	<b>Junior Research Fellow</b> University of Oxford (St. John’s College)	10/2017 – 09/2021
EDUCATION	<b>Stanford University</b> Ph.D. Physics <i>Thesis:</i> Dynamical constraints on the galaxy–halo connection <i>Supervisor:</i> Risa Wechsler	09/2012 – 06/2017
	<b>University of Oxford</b> (St. John’s College) MPhys. Astrophysics & Theoretical Physics, first class honours <i>Thesis:</i> The baryonic Tully-Fisher relation predicted by cold dark matter cosmogony <i>Supervisor:</i> Subir Sarkar	10/2008 – 06/2012
SELECTED AWARDS AND HONOURS	Royal Society Enhancement grant	2022, 2023
	McWilliams Center Seed Grant (Carnegie Mellon University)	2021–2022
	Balzan Fellowship, Centre for Cosmological Studies, New College (University of Oxford)	01/2017 – 03/2017
	Paul H. Kirkpatrick award for excellence in teaching (Stanford University)	2014
	Gregory and Mary Chabolla Graduate Fellowship (Stanford University)	2012
	Scott Prize for best overall performance in the MPhys examination (University of Oxford)	2012

BP Prize for best MPhys project in theoretical physics (University of Oxford)	2012
Winton Capital Prize for highest marks in the second year Physics examinations (University of Oxford)	2010
Casberd Scholarship at St. John's College (University of Oxford)	2009
39 <sup>th</sup> International Physics Olympiad in Hanoi, Bronze Medal	2008

SELECTED  
SEMINARS AND  
PRESENTATIONS

**Exhaustive Symbolic Regression (or how to find the best function for your data)**

<i>Relativity and Cosmology Seminar</i> , QMUL	11/2023
<i>Webinar on Mathematics, Physics and Machine Learning</i> , IST Lisbon	05/2023
<i>ICG Monday Lunch Talk</i> , University of Portsmouth	05/2023
<i>Cosmology seminar</i> , University of Sussex	04/2023
<i>Cosmology seminar</i> , Imperial College London	03/2023
<i>Cosmology seminar</i> , University College London	01/2023

**Testing  $\Lambda$ CDM with local large-scale structure, galaxies, and stars**

<i>Dalitz seminar</i> , University of Oxford	05/2022
<i>JBCA colloquium</i> , University of Manchester	04/2022
<i>Cosmology seminar</i> , University of Pennsylvania	12/2021
<i>Astronomy seminar</i> , Case Western Reserve University	12/2021
<i>Cosmology seminar</i> , University of Hawaii	12/2021
<i>ICG astrophysics colloquium</i> , University of Portsmouth	11/2021

**Fundamental physics from galaxies**

<i>Astrophysics colloquium</i> , Institute for Theoretical Astrophysics, Oslo	01/2020
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**Astrophysical tests of gravity**

<i>The Paris-Saclay AstroParticle Symposium 2019</i>	10/2019
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**A local resolution of the Hubble tension: The impact of screened fifth forces on the cosmic distance ladder**

<i>Cosmic Controversies</i> , Chicago	10/2019
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**Galaxy velocity & size correlations, the halo Tully–Fisher relation and tests of the External Field Effect**

<i>Bonn gravitation workshop</i>	09/2019
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### **Fifth force searches in galaxies**

<i>PPPAC seminar</i> , Imperial College London	03/2021
<i>Progress on Old and New Themes in Cosmology</i> , Avignon, France	12/2020
<i>Dark Energy in a Dark Age</i> , APCTP, Pohang, South Korea	10/2020
<i>CRAG seminar</i> , Sheffield	10/2020
<i>Cosmology seminar</i> , Institute for Theoretical Astrophysics, Oslo	01/2020
<i>The Paris-Saclay AstroParticle Symposium 2019</i>	10/2019
<i>The Cosmic Web workshop</i> , Edinburgh	06/2019
<i>15th Patras Workshop on Axions, WIMPs and WISPs</i> , Freiburg	06/2019
<i>Cosmology seminar</i> , University College London	06/2019
<i>Astrophysics seminar</i> , Imperial College London	05/2019
<i>ICG colloquium</i> , Portsmouth	03/2019
<i>Cosmology seminar</i> , Durham ICC	02/2019
<i>LSS group meeting</i> , Edinburgh	02/2019
<i>Particle Theory Seminar</i> , Nottingham CAPT	02/2019
<i>IAP Universe Journal Club</i> , Paris	10/2018
<i>Cosmology group meeting</i> , University of Pennsylvania, Philadelphia	10/2018
<i>Cosmology seminar</i> , CITA, Toronto (online <a href="#">here</a> )	07/2018
<i>Aquila consortium group meeting</i> , Stockholm	03/2018

### **Gravitational maps and tests of screening**

<i>Aquila consortium group meeting</i> , MPIA, Garching	11/2017
<i>Cosmology group meeting</i> , University of Pennsylvania, Philadelphia	09/2017

### **Dynamical constraints on the galaxy–halo connection**

<i>The Physics of Galaxy Scaling Relations</i> , Queen’s University, Kingston ( <a href="#">poster</a> )	07/2018
<i>Lunchtime Talk</i> , ESO, Garching	11/2017
<i>Quantifying and Understanding the Galaxy–Halo Connection</i> , KITP, University of California Santa Barbara (poster)	05/2017
<i>Cosmology Seminar</i> , University of Sussex	08/2016
<i>Cosmology Seminar</i> , University College London	08/2016
<i>Galaxies Discussion Group</i> , Cambridge	08/2016
<i>FLAT Talk</i> , Durham	08/2016
<i>Institute for Astronomy Seminar</i> , Edinburgh	08/2016

### **Testing halo abundance matching with galaxy dynamics**

<i>2016 Munich Joint Conference, Discs in Galaxies</i> , ESO, Garching (poster)	07/2016
<i>SnowPAC 2016, The Galaxy–Halo Connection</i> , Snowbird, Utah, USA	03/2016

## The Tully–Fisher and mass–size relations from halo abundance matching

<i>CosmoClub Cosmology Seminar</i> , UCSC	11/2015
<i>Santa Cruz Galaxy Workshop</i> , UCSC (online <a href="#">here</a> )	08/2015
<i>KIPAC Tea</i> , Stanford	06/2015

POSTDOC	<i>Ricardo Landim</i>	
SUPERVISION	Constraining screened scalar–tensor theories with galaxy dynamics	2022 –
STUDENT	<i>Alicia Martin</i> (PhD, Oxford)	
SUPERVISION	Machine-learning fundamental physics from cosmology (w/ P. Ferreira & D. Bartlett)	2023 –
	<i>Param Upadhyay</i> (BSc, Tufts)	
	A second look at the bulk flow of CosmicFlows-4 (w/ S. von Hausegger & S. Sarkar)	2023
	<i>Amelia Ford</i> (BSc, Southampton)	
	Using genetic algorithms to find the best function for your data	2023
	<i>Dhruva Patel</i> (BSc, Open University)	
	Testing the isotropy of the universe	2023
	<i>Tomas Sousa</i> (MPhys, Nottingham)	
	Machine-learning the inflaton potential (w/ P. Ferreira & D. Bartlett)	2023
	<i>Richard Stiskalek</i> (PhD, Oxford)	
	Leveraging constrained large-scale structure simulations for new tests of physics (w/ J. Devriendt & A. Slyz)	2022 –
	<i>Nazanin Azimi</i> (BSc, CMU)	
	Emulating stellar structure simulations	2022
	<i>Ekaterine Dadiani</i> (PhD, CMU)	
	The galaxy–halo connection in the MassiveBlack-II simulation	2021 – 2022
	<i>Øyvind Christiansen</i> (PhD, Oslo)	
	Simulating asymmetric correlation functions in modified gravity (w/ D. Mota)	2021 –
	<i>Tariq Yasin</i> (DPhil, Oxford)	
	Combining kinematic and photometric constraints on the galaxy–halo connection (w/ J. Devriendt & A. Slyz)	2020 – 2023
	<i>Maxwell Hutt</i> (MPhys, Oxford)	
	Topics in constrained N-body simulation (w/ J. Devriendt & A. Slyz)	2020 – 2022
	<i>Deaglan Bartlett</i> (DPhil, Oxford)	
	Fundamental physics from galaxies (w/ P. Ferreira)	2019 – 2022
	<i>Richard Stiskalek</i> (BSc, Glasgow)	
	Halo abundance matching with total baryonic mass	2019
	<i>Isabel Sands</i> (BSc, Yale)	
	Numerical solutions for scalar field profiles (w/ P. Ferreira)	2019 – 2020

	<i>Robert Clemenson</i> (MPhys, Oxford) Non-gaussianity of weak lensing likelihoods (w/ S. Joudaki)	2019
	<i>Darsh Kodwani</i> (DPhil, Oxford) Screened modified gravity in relativistic perturbation theory	2018 – 2019
	<i>Thomas Holvey</i> (MPhys, Oxford) Baryon mass functions from ALFALFA $\times$ SDSS	2018 – 2019
	<i>Eliza Dickie</i> (MPhys, Oxford) Fifth-force observables in hydrodynamical simulations	2018 – 2019
	<i>Kris Pardo</i> (PhD, Princeton) Testing self-interacting dark matter with galaxy warps (w/ P. Ferreira)	2018 – 2019
	<i>William Martin</i> (BSc, Cambridge) Dynamical probes of screened fifth forces	2018
TEACHING	Lecturer: Functions of a complex variable (Portsmouth)	2023 –
	Exploring galaxies with the Sloan Digital Sky Survey (CMU)	2022
	Tutor for Cosmology 4 <sup>th</sup> year MMathPhys course (Oxford)	Hilary 2021
	Tutor for Astrophysics 4 <sup>th</sup> year MPhys major option (Oxford)	2020–2021
	Tutor for Mechanics CP1 (Oxford)	Hilary 2018
	<b>Stanford Teaching Assistantships</b>	
	Cosmology ( <i>Phys 361</i> ; graduate level)	Winter 2016
	Intermediate Electromagnetism II ( <i>Phys 121</i> ; 2nd yr undergraduate)	Spring 2015
	Introduction to Laboratory Physics ( <i>Phys 67</i> ; 1st yr undergraduate)	Spring 2014
	Mechanics and Special Relativity ( <i>Phys 61</i> ; 1st yr undergraduate)	Autumn 2013
	Modern Physics ( <i>Phys 26</i> ; physics for non-majors)	Spring 2013
	Physics TA mentor (Stanford Mentors in Teaching Program)	2014 – 2017
	Mentor, “Gravity! From the Big Bang to Black Holes” (MOOC run by Paris Diderot)	2016
	Stanford Splash!	2014 – 2017
LANGUAGES	Python, Jax, C/C++, Mathematica, Fortran, Matlab, SQL, ROOT Simulation codes: RAMSES, MESA English (native), French (intermediate), German (basic)	
SERVICE	Referee for <i>MNRAS</i> , <i>ApJ</i> , <i>JCAP</i> , <i>A&amp;A</i> , <i>MDPI (Galaxies, Particles)</i> , <i>IJMPA</i> , <i>EPJP</i> , <i>MPLA</i> , <i>Phys. Lett. B</i> , <i>Hindawi</i> , Open Journal of Astrophysics and <i>Phys. Rev. (PRD, PRR, PRL)</i>	2016 –
	ICG colloquium organiser (Portsmouth)	2022 –

	EuCAPT Portsmouth & Sussex rep and Training task force member	2022 –
	“Stellar tests of gravity” workshop organiser (CMU)	03/2022
	McWilliams Journal Club organiser (CMU)	2021 – 2022
	External grant reviewer for the Polish National Science Centre ( $\times 2$ )	2020 – 2021
	MMathPhys masters project assessor (Oxford)	2019
	<a href="#">Aquila Consortium</a> group meeting organiser	05/2019
	Academic Services Committee (St. John’s College)	2019 – 2020
	Cosmology Reading Group organiser (Oxford)	2017 – 2019
	<a href="#">Novel Probes Project</a> , founding member	2017
OUTREACH	SciTech Day career panelist (Carnegie Science Center, Pittsburgh)	12/2021
	Oxford Stargazing, Cosmology stall	2018 – 2019
	<b>St. John’s College</b>	
	Inspire Digital column “ <a href="#">Dr Harry’s Questions</a> ”	2019 – 2020
	Research blast	02/2020
	Teachers’ Residential Programme mini-seminar	04/2019
PUBLICATIONS	<a href="#">arXiv</a>	
	<a href="#">NASA ADS</a>	
	<a href="#">INSPIRE HEP</a>	