

Harry Desmond

CONTACT INFORMATION	University of Oxford Denys Wilkinson Building Keble Road Oxford OX1 3RH	<i>Email:</i> harry.desmond@physics.ox.ac.uk <i>Web:</i> Oxford physics ; St John's College <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	University of Oxford (St. John's College), Oxford, UK Junior Research Fellow	2017 – present
EDUCATION	Stanford University , Stanford, CA, USA Ph.D. Physics <i>Thesis:</i> Dynamical constraints on the galaxy–halo connection <i>Supervisor:</i> Risa Wechsler	2012 – June 2017
	University of Oxford (St. John's College), Oxford, UK 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	2008 – 2012
SELECTED AWARDS AND HONOURS	Balzan Fellowship, Centre for Cosmological Studies, New College (University of Oxford) Paul H. Kirkpatrick award for excellence in teaching (Stanford University) Gregory and Mary Chabolla Graduate Fellowship (Stanford University) Scott Prize for best overall performance in the MPhys examination (University of Oxford) BP Prize for best MPhys project in theoretical physics (University of Oxford) Winton Capital Prize for highest marks in the second year Physics examinations (University of Oxford) Casberd Scholarship at St. John's College (University of Oxford) 39 th International Physics Olympiad in Hanoi, Bronze Medal	Jan – Mar 2017 2014 2012 2012 2012 2010 2009 2008
SELECTED SEMINARS AND PRESENTATIONS	Fundamental physics from galaxies <i>Astrophysics colloquium</i> , Institute for Theoretical Astrophysics, Oslo	01/2020

Astrophysical tests of gravity	
<i>The Paris-Saclay AstroParticle Symposium 2019</i>	10/2019
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
Galaxy velocity & size correlations, the halo Tully–Fisher relation and tests of the External Field Effect	
<i>Bonn gravitation workshop</i>	09/2019
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 here)	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 (poster)	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*2016 Munich Joint Conference, Discs in Galaxies*, ESO, Garching (poster) 07/2016*SnowPAC 2016, The Galaxy–Halo Connection*, Snowbird, Utah, USA 03/2016**The Tully–Fisher and mass–size relations from halo abundance matching***CosmoClub Cosmology Seminar*, UCSC 11/2015*Santa Cruz Galaxy Workshop*, UCSC (online [here](#)) 08/2015*KIPAC Tea*, Stanford 06/2015

STUDENT	<i>Øyvind Christiansen</i> (PhD, Oslo)	
SUPERVISION	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 –
	<i>Maxwell Hutt</i> (MPhys, Oxford)	
	Topics in constrained N-body simulation (w/ J. Devriendt & A. Slyz)	2020 –
	<i>Deaglan Bartlett</i> (DPhil, Oxford)	
	Fundamental physics from galaxies (w/ P. Ferreira)	2019 –
	<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 –
	<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 × 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	Tutor for Cosmology 4 th year MMathPhys course (Oxford)	Hilary 2021
	Tutor for Astrophysics 4 th year MPhys major option (Oxford)	2020–2021
	Tutor for Mechanics CP1 (Oxford)	Hilary 2018

Stanford Teaching Assistantships

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, C/C++, Mathematica, Fortran, Matlab, SQL, ROOT
Simulation codes: RAMSES, MESA
English (native), French (intermediate), German (basic)

SERVICE Referee for *MNRAS*, *ApJ*, *JCAP*, *A&A*, *MDPI (Galaxies, Particles)*, *IJMPA*, *EPJP*,
MPLA and *Phys. Rev. (PRD, PRR, PRL)* 2016 –
[Novel Probes Project](#), founding member 2017 –
External grant reviewer for the Polish National Science Centre (×2) 2020 – 2021
MMathPhys masters project assessor (Oxford) 2019
Cosmology Reading Group organiser (Oxford) 2017 – 2019
[Aquila Consortium](#) group meeting organiser 05/2019
Academic Services Committee (St. John’s College) 2019 – 2020

OUTREACH Oxford Stargazing, Cosmology stall 2018 – 2019
St. John’s College
Inspire Digital column “[Dr Harry’s Questions](#)” 2019 –
Research blast 02/2020
Teachers’ Residential Programme mini-seminar 04/2019

PUBLICATIONS 1. “Constraints on Equivalence Principle Violation from Gamma Ray Bursts” D. J.
Bartlett, D. Bergsdal, **H. Desmond**, P. G. Ferreira, J. Jasche. *Phys. Rev. D* submitted
(2021). [[arXiv:2106.15290](#)]
2. “Calibrating galaxy formation effects in galactic tests of fundamental physics” D. J.
Bartlett, **H. Desmond**, P. G. Ferreira. *Phys. Rev. D* **103:123502** (2021).
[[arXiv:2103.10356](#)]

3. “The dependence of subhalo abundance matching on galaxy photometry and selection criteria” R. Stiskalek, **H. Desmond**, T. Holvey, M. G. Jones. *MNRAS* accepted (2021). [[arXiv:2101.02765](#)]
4. “A 5% measurement of the gravitational constant in the Large Magellanic Cloud” **H. Desmond**, J. Sakstein, B. Jain. *Phys. Rev. D* **103**:024028 (2021). [[arXiv:2012.05028](#)]
5. “Constraints on galileons from the positions of supermassive black holes” D. J. Bartlett, **H. Desmond**, P. G. Ferreira. *Phys. Rev. D* **103**:023523 (2021). [[arXiv:2010.05811](#)]
6. “Testing the Strong Equivalence Principle: Detection of the External Field Effect in Rotationally Supported Galaxies” K.-H. Chae, F. Lelli, **H. Desmond**, S. S. McGaugh, P. Li, J. M. Schombert. *ApJ* **904**:51 (2020). [[arXiv:2009.11525](#)]
7. “Galaxy morphology rules out astrophysically relevant Hu-Sawicki $f(R)$ gravity” **H. Desmond**, P. G. Ferreira. *Phys. Rev. D* **102**:104060 (2020). [[arXiv:2009.08743](#)]
8. “Spatially offset black holes in the Horizon-AGN simulation and comparison to observations” D. J. Bartlett, **H. Desmond**, J. Devriendt, P. G. Ferreira, A. Slyz. *MNRAS* **500**:4639 (2020). [[arXiv:2007.01353](#)]
9. “Screened fifth forces lower the TRGB-calibrated Hubble constant too” **H. Desmond**, J. Sakstein. *Phys. Rev. D* **102**:023007 (2020). [[arXiv:2003.12876](#)]
10. “Testing Self-Interacting Dark Matter with Galaxy Warps” K. Pardo, **H. Desmond**, P. G. Ferreira. *Phys. Rev. D* **100**:123006 (2019). [[arXiv:1911.04497](#)]
11. “The Novel Probes Project – Tests of Gravity on Astrophysical Scales” T. Baker *et al.* *Rev. Mod. Phys.* **93**:15003 (2021). [[arXiv:1908.03430](#)]
12. “A local resolution of the Hubble tension: The impact of screened fifth forces on the cosmic distance ladder” **H. Desmond**, B. Jain, J. Sakstein. *Phys. Rev. D* **100**:043537 (2019). [[arXiv:1907.03778](#)]
13. “Screened Fifth Forces Mediated by Dark Matter–Baryon Interactions: Theory and Astrophysical Probes” J. Sakstein, **H. Desmond**, B. Jain. *Phys. Rev. D* **100**:104035 (2019). [[arXiv:1907.03775](#)]
14. “Constraints on Chameleon- $f(R)$ Gravity from Galaxy Rotation Curves of the SPARC Sample” A. P. Naik, E. Puchwein, A.-C. Davis, D. Sijacki, **H. Desmond**. *MNRAS* **489**:771 (2019). [[arXiv:1905.13330](#)]
15. “Screened fifth forces in parity-breaking correlation functions” D. Kodwani, **H. Desmond**. *Phys. Rev. D* **100**: 064030 (2019). [[arXiv:1904.12310](#)]
16. “The baryonic Tully-Fisher relation for different velocity definitions and implications for galaxy angular momentum” F. Lelli, S. S. McGaugh, J. Schombert, **H. Desmond**, H. Katz. *MNRAS* **484**:3267 (2019). [[arXiv:1901.05966](#)]

17. “The Fifth Force in the Local Cosmic Web” **H. Desmond**, P. G. Ferreira, G. Lavaux, J. Jasche. *MNRAS* **483**:L64 (2019). [[arXiv:1802.07206](#)]
18. “The Tight Empirical Relation between Dark Matter Halo Mass and Flat Rotation Velocity for Late-Type Galaxies” H. Katz, **H. Desmond**, S. S. McGaugh, F. Lelli. *MNRAS* **483**:L98 (2019). [[arXiv:1810.12347](#)]
19. “Stellar Feedback and the Energy Budget of Late-Type Galaxies: Missing Baryons and Core Creation” H. Katz, **H. Desmond**, F. Lelli, S. S. McGaugh, A. Di Cintio, C. Brook, J. Schombert. *MNRAS* **480**:4287 (2018). [[arXiv:1808.00971](#)]
20. “Uncorrelated velocity and size residuals across galaxy rotation curves” **H. Desmond**, H. Katz, F. Lelli, S. S. McGaugh. *MNRAS* **484**:239 (2019). [[arXiv:1808.00271](#)]
21. “Fifth force constraints from galaxy warps” **H. Desmond**, P. G. Ferreira, G. Lavaux, J. Jasche. *Phys. Rev. D* **98**, 083010 (2018). [[arXiv:1807.11742](#)]
22. “Fifth force constraints from the separation of galaxy mass components” **H. Desmond**, P. G. Ferreira, G. Lavaux, J. Jasche. *Phys. Rev. D* **98**, 064015 (2018). [[arXiv:1807.01482](#)]
23. “Reconstructing the gravitational field of the local universe” **H. Desmond**, P. G. Ferreira, G. Lavaux, J. Jasche. *MNRAS* **474**:3152 (2018). [[arXiv:1705.02420](#)]
24. “The scatter, residual correlations and curvature of the SPARC baryonic Tully–Fisher relation” **H. Desmond**. *MNRAS* **472**:L35 (2017). [[arXiv:1706.01017](#)]
25. “On the galaxy–halo connection in the EAGLE simulation” **H. Desmond**, Y. Y. Mao, R. H. Wechsler, R. A. Crain, J. Schaye. *MNRAS* **471**:L11 (2017). [[arXiv:1612.01029](#)]
26. “A statistical investigation of the mass discrepancy–acceleration relation” **H. Desmond**. *MNRAS* **464**:4160 (2016). [[arXiv:1607.01800](#)]
27. “The Faber–Jackson relation and Fundamental Plane from halo abundance matching” **H. Desmond**, R. H. Wechsler. *MNRAS* **465**:820 (2016). [[arXiv:1604.04670](#)]
28. “On the Impact of Cepheid Outliers on the Distance Ladder” M. R. Becker, **H. Desmond**, E. Rozo, P. Marshall, E. S. Rykoff (2015) [[arXiv:1507.07523](#)]
29. “The Tully–Fisher and mass–size relations from halo abundance matching” **H. Desmond**, R. H. Wechsler. *MNRAS* **454**:322 (2015). [[arXiv:1506.00169](#)]
30. “The baryonic Tully-Fisher relation predicted by cold dark matter cosmogony” **H. Desmond** (2012). [[arXiv:1204.1497](#)]