

# Natalie B. Hogg

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Postdoctoral researcher at the Institut de Physique Théorique, CEA Paris-Saclay

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## Employment

- 06/2021 – present **Postdoctoral researcher**  
IFT UAM–CSIC (06/2021 – 01/2022) & IPHT CEA Paris-Saclay (02/2022 – present)  
Developing novel observables in strong and weak gravitational lensing.  
Investigating the use of gravitational waves as a probe of cosmology.  
Supervisors: Dr Pierre Fleury, Dr Matteo Martinelli
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## Education

- 10/2017 – 02/2021 **PhD in Cosmology**, University of Portsmouth  
Thesis: Beyond  $\Lambda$ CDM: current and future constraints on alternative cosmological models  
Supervisors: Dr Marco Bruni, Prof David Wands, Prof Robert Crittenden
- 09/2013 – 07/2017 **MPhys Astrophysics 1<sup>st</sup> class hon.**, Aberystwyth University  
with **Breen Prize** for best Master's dissertation in physics  
Master's dissertation: Dynamical models of dark energy & their background cosmological evolution  
Supervisor: Prof Carsten van de Bruck (University of Sheffield)
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## Major awards and prizes

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|---------|---|-------|
| 06/2021 | <b>G-Research quantitative research grant</b><br>Hardship grant from UK-based financial technology company<br><i>Used to support my research in the gap between finishing my PhD and starting my contract at the IFT, which was delayed due to the Covid-19 pandemic and the UK's withdrawal from the European Union.</i> | £2000 |
| 05/2018 | <b>Long Term Attachment</b><br>UK Science and Technology Facilities Council travel grant<br><i>Used visiting the IFT, January – March 2020.<br/>Visit curtailed by Covid-19 pandemic.</i>   | £3600 |
| 05/2018 | <b>Santander Mobility Award</b><br>University of Portsmouth and Santander Bank travel grant<br><i>Used for ICTP Summer School on Cosmology, Trieste, June 2018</i>  | £500  |
| 01/2018 | <b>Short Term Scientific Missions</b><br>Two CANTATA (EU COST Action) travel grants<br><i>Used visiting Lorentz Institute, Leiden, March and November 2018</i>  | €2150 |
| 07/2017 | <b>Breen Prize</b><br>Best Master's dissertation in physics, Aberystwyth University   | £2000 |
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## Recent talks

- 04/2022 **The distance duality relation: violations, constraints and biases**  
GReCo Seminar, IAP  
*Invited talk*
- 10/2021 **The distance duality relation: violations, constraints and biases**  
Centre for Astronomy and Particle Theory seminar, University of Nottingham  
*Invited talk, delivered virtually*
- 07/2021 **Novel probes of the distance duality relation**  
Cosmology group seminar, Lorentz Institute, Leiden  
*Invited talk, delivered virtually*
- 07/2021 **Constraints on the distance duality relation with standard sirens**  
Cosmology from Home conference  
*Pre-recorded, available on Youtube*
- 05/2021 **Constraints on the distance duality relation with standard sirens**  
EuCAPT Symposium, CERN  
*Delivered virtually*
- 04/2021 **Is the standard model of cosmology wrong?**  
Physics department seminar, Aberystwyth University  
*Invited talk, delivered virtually*
- 04/2021 **Constraints on the distance duality relation with standard sirens**  
Britgrav21, University College Dublin  
*Delivered virtually*
- 04/2020 **New constraints on beyond- $\Lambda$ CDM cosmologies**  
Cosmology group seminar, Queen Mary University of London  
*Invited talk, delivered virtually*
- 12/2019 **Interacting vacuum dark energy**  
TEXAS Symposium, University of Portsmouth  
*Awarded best talk in session prize*
- 12/2019 **Interacting vacuum dark energy**  
Cosmology and relativity group seminar, University of Sheffield  
*Invited talk*

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## Selected outreach and public engagement

- 02/2022 **The Universe Howling — What are Standard Sirens?**  
Outreach video made for the IFT Youtube channel with over 13,000 views
- 05/2018 **British Federation of Women Graduates annual meeting**  
Gave a talk on dark energy and cosmology research to a general audience
- 01/2018, 01/2019 **Stargazing Live**  
Demonstrator for various activities at this annual Portsmouth Historic Dockyard public event
- 03/2018 **Night Sky Live**  
Demonstrator for various activities at this public event at Winchester Science Centre
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## Service

- 2022 –present    **Organiser**, IPhT cosmology & gravity journal club
- 2020 – present    **Referee** for Monthly Notices of the Royal Astronomical Society,  
Physics of the Dark Universe, Astronomy and Computing
- 2020                **Chair**, local organising committee, South Coast Cosmology meeting, University of Portsmouth
- 2019                **Member**, local organising committee, A History of the Universe in Redshift conference
- 2018/19            **PhD student representative**, ICG management committee, University of Portsmouth  
**PhD student representative**, Faculty of Technology research degrees committee, University of Portsmouth
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## Publications

- [1] Fabrizio Renzi, **Natalie B. Hogg** and William Giarè, *The resilience of the Etherington–Hubble relation*, arxiv:2112.05701.
- [2] R. Alves Batista et al, *EuCAPT White Paper: Opportunities and Challenges for Theoretical Astroparticle Physics in the Next Decade*, arxiv:2110.10074v1.
- [3] **Natalie B. Hogg** and Marco Bruni, *Shan–Chen interacting vacuum cosmology*, *Monthly Notices of the Royal Astronomical Society* (2022) 4430 [arxiv:2109.08676].
- [4] Fabrizio Renzi, **Natalie B. Hogg**, Matteo Martinelli and Savvas Nesseris, *Strongly lensed supernovae as a self-sufficient probe of the distance duality relation*, *Physics of the Dark Universe* (2021) 100824 [arxiv:2010.04155].
- [5] **Natalie B. Hogg**, Matteo Martinelli and Savvas Nesseris, *Constraints on the distance duality relation with standard sirens*, *Journal of Cosmology and Astroparticle Physics* (2020) 019 [arxiv:2007.14335].
- [6] **Natalie B. Hogg**, Marco Bruni, Robert Crittenden, Matteo Martinelli and Simone Peirone, *Latest evidence for a late time vacuum – geodesic CDM interaction*, *Physics of the Dark Universe* (2020) 100583 [arxiv:2002.10449].
- [7] Matteo Martinelli, **Natalie B. Hogg**, Simone Peirone, Marco Bruni and David Wands, *Constraints on the interacting vacuum – geodesic CDM scenario*, *Monthly Notices of the Royal Astronomical Society* (2019) 3423 [arxiv:1902.10694].
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## References

Dr Marco Bruni                    marco.bruni@port.ac.uk  
Dr Matteo Martinelli            matteo.martinelli@uam.es  
Dr Pierre Fleury                 pierre.fleury@uam.es  
Prof Carsten van de Bruck      c.vandebruck@sheffield.ac.uk

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