

CONTACT INFORMATION

<i>Institute</i>	Institute for Astronomy (IfA), University of Edinburgh
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RESEARCH INTERESTS

Cosmology: large-scale structure, galaxy surveys, gravitational lensing, dark energy and dark matter, relativistic effects, primordial non-Gaussianity, neutrino physics, non-linear structure formation, halo model, cosmological tensions, model-agnostic data analysis, blinding methods.

ACADEMIC POSITIONS

Postdoctoral Research Associate **October 2022 - present**
University of Edinburgh

- Line Manager: Prof. Florian Beutler
- Institute: Institute for Astronomy, Royal Observatory Edinburgh

EDUCATION

Ph.D. in Physics **October 2018 - September 2022**
University of Barcelona

- Thesis: From the Precision Era towards the Accuracy Era of Cosmology with DESI (excellent *Summa Cum Laude*)
- Advisors: Dr. Héctor Gil-Marín and Prof. Licia Verde
- Institute: Quantum Physics and Astrophysics Department, Institute of Cosmos Sciences

MSc. Physics **October 2016 - September 2018**
RWTH Aachen University

- Thesis: Accurate Non-Linear Corrections Including Baryonic Feedback in Boltzmann Codes
- Advisors: Dr. Maria Archidiacono and Prof. Julien Lesgourgues
- Institute: Institute for theoretical particle physics and cosmology

BSc. Physics **October 2012 - September 2016**
RWTH Aachen University

- Thesis: Dark Matter Constraints from AMS-02 Antiprotons
- Advisors: Dr. Alessandro Cuoco and Prof. Julien Lesgourgues
- Institute: Institute for theoretical particle physics and cosmology

Exchange Student **October 2016 - March 2017**
Autonomous University of Madrid

- Erasmus scholarship at Institute of theoretical physics
- Participation in master courses of cosmology, astronomy and particle physics.

AWARDS

Spanish Astronomy Society Thesis Prize

2023

For the best Doctoral Thesis of the year in Astronomy and Astrophysics in Spain.

COLLABORATION MEMBERSHIP

Dark Energy Spectroscopic Instrument (DESI)

October 2018 - present

- Participation in Galaxy and quasar clustering and DESI-II working groups.
- Co-chair of the Education and Public Outreach Committee.
- Collaboration meetings: Attendance and active contributions (1 plenary talk, 4 parallel session talks, 6 spotlight talks) to 8 meetings between 2019 and 2023.
- Remote assistant observing for DESI (once or twice per year)

Euclid Consortium

June 2023 - present

- Participation in clustering and lensing working groups.

OUTREACH ACTIVITIES

- Co-chair of DESI Education and Public Outreach Committee (2023-present).
- Member of DESI Education and Public Outreach Committee (2021-2023).
- Handling DESI social media accounts (2021-present).
- Written Blog article about DESI ambassador BaoBan (May 2023).
- Coordinated German translation of DESI planetarium film "5000 Eyes" (Feb. 2023).
- Volunteering work at Royal Observatory Edinburgh Open Days (Sep. 2023) and at primary school with the mobile planetarium of the ROE visitor's center.
- Volunteering work to help with a mobile planetarium show at a local primary school (March 2023).
- Participation in artistic project "The ends of everything" in collaboration with the ICC and artist Andy Gracie (2021-2022).

SERVICE

- Referee for *Monthly Notices of the Royal Astronomical Society* (MNRAS), the *Journal of Cosmology and Astroparticle Physics* (JCAP), and for the *Astrophysical Journal* (ApJ) of the American Astronomical Society (AAS).
- Co-organizer of the PhD meetings at the ICC, University of Barcelona (2021-2022).

MENTORING

- Sophia Schubert, undergraduate student at University of Edinburgh, summer project "*The universe in a soup plate*", (June 2023 - August 2023)
- Marnix Looijmans, graduate student at University of Edinburgh, Mphys project "*Testing the halo model in 1D and 2D*", (September 2023 -present)

SKILLS

<i>Languages</i>	German (native), English (fluent), Spanish (fluent), Catalan (basic), French (basic), Portuguese (basic), Romanian (basic), Latinum.
<i>Programming</i>	PYTHON, C, C++, FORTRAN, MATLAB, MATHEMATICA
<i>Cosmological Codes</i>	CLASS, CAMB, HMCODE, MONTEPYTHON, GETDIST

PUBLICATIONS

Metrics (NASA ADS)

13 citeable articles (11 published, 6 first-authored), ~ 637 citations, h -index = 11

1. DESI Collaboration (incl. **S. Brieden**), *The Early Data Release of the Dark Energy Spectroscopic Instrument*, [2306.06308]
Contribution: Active engagement in the DESI collaboration (also applicable below).
2. DESI Collaboration (incl. **S. Brieden**), *Validation of the Scientific Program for the Dark Energy Spectroscopic Instrument*, [2306.06307]
3. **S. Brieden**, H. Gil-Marín and L. Verde, *A tale of two (or more) h 's*, *JCAP* **2023** (Apr., 2023) 023, [2212.04522]
4. N. Schöneberg, H. Gil-Marín, L. Verde and **S. Brieden**, *BAO+BBN revisited – Growing the Hubble tension with a 0.7km/s/Mpc constraint*, *JCAP* **2022** (Nov., 2022) 039, [2209.14330]
Contribution: Providing cosmological ShapeFit likelihood.
5. B. Abareshi et al. (incl. **S. Brieden**), *Overview of the Instrumentation for the Dark Energy Spectroscopic Instrument*, *The Astronomical Journal* **164** (Oct., 2022) 5 [2205.10939]
6. **S. Brieden**, H. Gil-Marín and L. Verde, *Model-agnostic interpretation of 10 billion years of cosmic evolution traced by BOSS and eBOSS data*, *JCAP* **2022** (Aug., 2022) 024, [2204.11868]
7. **S. Brieden**, H. Gil-Marín and L. Verde, *PT challenge: Validation of ShapeFit on large-volume, high-resolution mocks*, *JCAP* **2022** (Jun., 2022) 005, [2201.08400].
8. **S. Brieden**, H. Gil-Marín and L. Verde, *Model-independent versus model-dependent interpretation of the SDSS-III BOSS power spectrum: Bridging the divide*, *Phys. Rev. D* **104** (Dec., 2021) L121301, [2106.11931].
9. **S. Brieden**, H. Gil-Marín and L. Verde, *ShapeFit: extracting the power spectrum shape information in galaxy surveys beyond BAO and RSD*, *JCAP* **2021** (Dec., 2021) 054, [2106.07641].
10. A. J. Mead, **S. Brieden**, T. Tröster and C. Heymans, *HMCODE-2020: improved modelling of non-linear cosmological power spectra with baryonic feedback*, *MNRAS* **502** (Mar., 2021) 1401–1422, [2009.01858].
Contribution: Given my experience in implementing the previous 2016 version, I helped to discover many improvements including a more physical baryonic feedback implementation.
11. **S. Brieden**, H. Gil-Marín, L. Verde and J. L. Bernal, *Blind Observers of the Sky*, *JCAP* **2020** (Sept., 2020) 052, [2006.10857].
12. A. Spurio Mancini, F. Köhlinger, B. Joachimi, V. Pettorino, B. M. Schäfer, R. Reischke et al. (incl. **S. Brieden**), *KiDS + GAMA: constraints on horndeski gravity from combined large-scale structure probes*, *MNRAS* **490** (Dec., 2019) 2155–2177, [1901.03686].
Contribution: Delivering the code for non linear modeling (HMcode-2016 in CLASS).
13. H. Hildebrandt, F. Köhlinger, J. L. van den Busch, B. Joachimi, C. Heymans, A. Kannawadi et al. (incl. **S. Brieden**), *KiDS+VIKING-450: Cosmic shear tomography with optical and infrared data*, *A&A* **633** (Jan., 2020) A69, [1812.06076].
Contribution: Delivering the code for non linear modeling (HMcode-2016 in CLASS).

INVITED TALKS AND CONFERENCE CONTRIBUTIONS

1. Invited talk at Early Universe and AliCPT Forum - “*A tale of two (or more) h ’s*” - October 2023.
2. Invited talk at CosmoPalooza virtual webinar - “*DESI: Cosmology beyond BAO on large scales*”, recording available on YouTube - October 2023.
3. Invited talk at EAS 2023 conference within Session S10c - Kraków - “*Cosmology with the Dark Energy Spectroscopic Instrument (DESI)*” - July 2023.
4. Invited talk - University College London - “*A tale of two (or more) h ’s*” - May 2023.
5. Invited seminar talk - Institut d’Astrophysique de Paris, Sorbonne Université - “*A tale of two (or more) h ’s*” - March 2023.
6. Contributed talk at DEX-XIX Workshop - University of Edinburgh - “*A tale of two (or more) h ’s*” - January 2023.
7. Contributed talk at Essential Cosmology for the Next Generation conference - Cancún (Mexico) - “*From the Precision Era towards the Accuracy Era of Cosmology with DESI*” - December 2022.
8. Contributed talk at “Cosmology from Home” conference with Héctor Gil-Marín - “*Model-agnostic interpretation of 10 billion years of cosmic evolution traced by BOSS and eBOSS data*” - pre-recorded talk available on YouTube - July 2022.
9. Plenary talk (virtual) at DESI Collaboration Meeting - Berkeley Lab - “*Re analysis of BOSS and eBOSS data including the Shape information*” - June 2022.
10. Contributed talk at IberiCOS conference - Universidad Autónoma de Barcelona - “*Bridging the divide between theoretical and observational cosmology: ShapeFit results from the BOSS+eBOSS legacy.*” - May 2022.
11. Invited talk (virtual) - University of Edinburgh, Royal Observatory Edinburgh - “*ShapeFit. Model-independent versus model-dependent interpretation of galaxy power spectra: Bridging the divide*” - November 2021.
12. Poster (virtual) at Cosmo’21 conference - University of Illinois - “*Model independent vs Model dependent Interpretation of galaxy power spectra*” - August 2021.
13. Invited talk (virtual) - Universidad Nacional Autónoma de México (UNAM), “*ShapeFit: Bridging the divide between model-independent vs. model-dependent interpretation of galaxy power spectra*” - June 2021.
14. Invited talk (virtual) - University of Milan, “*HMcode-2020: Improved modelling of non-linear cosmological power spectra with baryonic feedback.*” - November 2020.
15. Invited talk (virtual) - Euclid Collaboration meeting - “*Blinding redshift surveys at the catalog level*” - February 2020
16. Invited talk (virtual) - Universidad Nacional Autónoma de México (UNAM) - “*Cosmology with CLASS.*” - December 2019.