

# Arthur Loureiro

SENIOR SCIENTIST & RESEARCH FELLOW · ASTROPHYSICS & COSMOLOGY

Royal Observatory of Edinburgh, University of Edinburgh, Edinburgh, UK  
Physics & Astronomy Department, University College London, London, UK

✉ arthur.loureiro@ed.ac.uk | 🌐 arthurloureiro.github.io | 📧 arthurloureiro | 🐦 @cosmonist

## Research & Work Experience

### University of Edinburgh

Edinburgh, United Kingdom

SENIOR SCIENTIST/DEVELOPER (50% FTE)

Sept. 2021 - PRESENT

Euclid SGS Senior Scientist/Developer working with Prof. Andy Taylor on weak lensing shape measurement calibration and sensitivity.

### University College London

London, United Kingdom

RESEARCH FELLOW (50% FTE FROM SEPT. 2021)

Mar. 2020 - PRESENT

UCL Research Fellow working with Dr. Benjamin Joachimi on Bayesian methods for cosmological galaxy surveys such as the Euclid Satellite.

### Imperial College London

London, United Kingdom

POST-DOCTORAL RESEARCH ASSOCIATE (CURRENTLY VISITING RESEARCHER)

Dec. 2019 - PRESENT

PDRA working with Prof. Alan Heavens and Prof. Andrew Jaffe on Bayesian Hierarchical Models for Cosmic Shear on the sphere.

### University College London

London, United Kingdom

POST-DOCTORAL RESEARCH ASSISTANT

Dec. 2018 - Dec. 2019

Euclid SGS PDRA working with Dr. Benjamin Joachimi on pipeline development, testing, and validation for Weak Lensing power spectra.

## Education

### University College London

London, United Kingdom

PHD IN ASTROPHYSICS

2015 - 2019

Advisors: Dr. Filipe Abdalla and Prof. Ofer Lahav

Thesis: The Universe in Harmonic Space: Neutrinos and Dark Energy

### University of São Paulo

São Paulo, Brazil

MASTERS IN MATHEMATICAL PHYSICS

2013 - 2015

Advisor: Prof. L. Raul Abramo

Thesis: Galaxy Power Spectrum: A Monte-Carlo Approach

### Université de Montréal

Montréal, Canada

UNDERGRADUATE EXCHANGE

2012

Exchange program as a bachelor student in Physics under the Science without Borders Scholarship.

### Universidade Federal do Rio Grande do Sul

Porto Alegre, Brazil

UNDERGRADUATE DEGREE IN PHYSICS WITH EMPHASIS IN ASTROPHYSICS

2010 - 2013

Advisor: Prof. Silvio R. Dahmen

Dissertation: Relativistic Thermodynamics applied to Cosmological Models

## Skills & Professional Services

<b>Programming</b>	Advanced Python, Jupyter Notebook, Bash, and Slurm for HPC; intermediate C/C++, Mathematica, SQL.
<b>Cosmological Codes</b>	CLASS, Hi-CLASS, CAMB, Monte Python, Flask, CCL, Healpix, and Glass (co-developer)
<b>Peer Reviewer</b>	Journal of Cosmology and Astroparticle Physics, Monthly Notices of the Royal Astronomical Society
<b>Leadership Roles</b>	PDRA Representative at UCL's Astro Group (2020-2022), Co-Leading Euclid LE3 Weak Lensing Pre-Launch Key Project

## Languages

<b>English</b>	Fluent (speaking, reading, writing)
<b>Portuguese</b>	Native speaker
<b>French</b>	Intermediate (speaking, reading) and basic (writing)
<b>Spanish</b>	Basic (writing, speaking, reading)

## Grants & Awards

### UNIVERSITY COLLEGE LONDON (UNITED KINGDOM)

2020-2022 **UCL Provost Strategic Fund Fellowship**, University College London

£112,554

### NATIONAL COUNCIL FOR SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENT (BRAZIL)

2015-2018 **Science without Borders PhD Fellowship**, University College London

£131,378

2012 **Science without Borders Exchange Scholarship**, Université de Montréal

CAN\$6700

## Publications

- 1 *Fisher matrix for the angular power spectrum of multi-tracer galaxy surveys*  
L. R. Abramo, J. V. D. Ferri, I. L. Tashiro & **A. Loureiro** – ArXiv:2204.05057 (Submitted to JCAP)
- 2 *KiDS & Euclid: Cosmological implications of a pseudo- $C_\ell$  analysis of KiDS-1000 cosmic shear tomography*  
**A. Loureiro**, L. Whittaker, A. Spurio Mancini, KiDS Collaboration & Euclid Consortium – ArXiv:2110.06947 (Submitted to A&A)
- 3 *Upper Bound of Neutrino Masses from Combined Cosmological Observations and Particle Physics Experiments*  
**A. Loureiro**, A. Cuceu, et al., *Physical Review Letters*, 123 (8), 2019
- 4 *Cosmological measurements from angular power spectra analysis of BOSS DR12 tomography*  
**A. Loureiro**, B. Moraes, et al., *Mon. Notices of the Royal Astronomical Soc.*, 485 (1), 2019
- 5 *Fourier analysis of multitracer cosmological surveys*  
L. R. Abramo, L. F. Secco & **A. Loureiro**, *Mon. Notices of the Royal Astronomical Soc.*, 455 (4), 2016

### Collaboration Publications:

- 1 R. Upham, M. Brown, L. Whittaker & Euclid Consortium (incl. **A. Loureiro**), *A&A*, A114 (660), 2022
- 2 R. Saglia, S. De Nicola & Euclid Consortium (incl. **A. Loureiro**) – ArXiv:2206.01620 (Submitted to A&A)
- 3 L. Bisigello, C. J. Conselice & Euclid Consortium (incl. **A. Loureiro**) – ArXiv:2206.14944 (Submitted to MNRAS)

## Teaching Experience

### University College London

London, UK

TEACHING ASSISTANT - UNDERGRADUATE LEVEL

2016 - 2018

Practical Astronomy 2 (2017, 2018), Observational Astronomy 1 (2017), Practical Physics 2 (2017), Practical Skills for Astronomy (2016)

### University of São Paulo

São Paulo, BR

TEACHING ASSISTANT - UNDERGRADUATE LEVEL

2014 - 2015

Physical Cosmology (2015), Advanced Quantum Mechanics (2014)

### Universidade Federal do Rio Grande do Sul

Porto Alegre, BR

TEACHING ASSISTANT - UNDERGRADUATE LEVEL

2010 - 2013

Basic Astronomy (2011, 2013), Psychology of Education (2010)

### Private

Porto Alegre, BR

TUTOR - HIGH-SCHOOL LEVEL

2011 - 2013

Physics & Mathematics for high-school

## Research Supervision

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| 2020 - 2021 | <b>Lisa Goh (MSc)</b> , Co-supervisor together with Dr Lee Whittaker and Dr Benjamin Joachimi on a project “Pseudo- $C_\ell$ likelihood for the Euclid galaxy survey”  | UCL |
| Summer 2018 | <b>Andrei Cuceu (undergrad)</b> , Co-supervisor with Dr Bruno Moraes on a Summer Internships (12 weeks) project “Simultaneous constraints of Cosmology and redshift distribution from galaxy surveys and CMB data” (Funded by RAS) | UCL |
| Summer 2018 | <b>Marion Thomas (undergrad)</b> , Co-supervisor on a Summer Internship (12 weeks) project “Synergies between Spectroscopic and Photometric Galaxy Surveys” (Funded by RAS)  | UCL |
| Summer 2018 | <b>Joshua Lawton (undergrad)</b> , Co-supervisor on a Summer Internship (12 weeks) project “Creating a Galaxy Clustering Catalogue with PanSTARRS”   | UCL |
| Summer 2017 | <b>Andrei Cuceu (undergrad)</b> , Co-supervisor with Dr Bruno Moraes on a Summer Internship (12 weeks) project “Cosmological Constraints from Supernova Surveys and Planck CMB data”   | UCL |

## Outreach

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### Project Collaborator for #AstroThreadBR and #AstroMiniBR

Twitter

SOCIAL MEDIA ENGAGEMENT

2019-PRESENT

Engagement with the science enthusiasts community in Brazil via the #AstroThreadBR and #AstroMiniBR projects using twitter threads to educate the general public about astronomy. Threads have, on average, a reach of 10-20k impressions.

### Talk: “Weighing Ghost Particles with the Universe”

YouTube

PUBLIC ENGAGEMENT TALK

2020

Outreach talk for Astronomy on Tap London, live on YouTube. URL: <https://youtu.be/MLwBvdc675A>

### Article: “Ghost particles: how galaxies helped us weigh the lightest neutrino”

The Conversation

PRESS RELEASE

2019

Article published at The Conversation portal related to Loureiro et al. 2019b, informing the general public about the main results in the paper.

### Talk: “Hunting Ghosts with Galaxies”

Porto Alegre, BR

PUBLIC ENGAGEMENT TALK

2018

Outreach talk at a high school about Cosmology, Neutrinos, and data science.

### If a Tree falls in the Forrest: Cosmology meets Art

Grizdale Forest, UK

ART EXHIBITION

2018

Art exhibition in collaboration with the Royal College of Arts. Presentation of a workpiece “Confirmation of Time” in collaboration with the artist Franziska Hatton. URL: <http://ifatreefalls.rca.ac.uk>

### L’Observatoire Bizarre

London, UK

ROYAL ACADEMY OF ARTS LATES

2018

Public engagement in collaboration with the Royal College of Arts at the Dada & Surrealism RA Late. Organised by Dr. Andrew Pontzen and Michaela French.

### Physics Club: “Time in Cosmology”

Porto Alegre, BR

PUBLIC ENGAGEMENT TALK

2015

Outreach talk at the Physics Club, Universidade Federal do Rio Grande do Sul.

## Event Organisation

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### GR effects in observing the Large-Scale Structure of the Universe

Porto, PT

SESSION CHAIR

Jun/2022

Chaired the session on “General Relativity effects in new cosmological probes”.

### Cosmology and Extragalactic Seminars at UCL

London, UK

ORGANISER

Jan/2019 - Jan/2021

UCL’s Cosmology and Extragalactic weekly seminars - *In person & online*

### Euclid CalWG, Garage Day & OU-LE3 Meeting

London, UK

ORGANISER

2017

Four day meeting at the Royal Astronomical Society and University College London.

### Euclid Consortium Meeting

London, UK

ORGANISATIONAL GROUP

2017

Meeting at University College London

### Euclid Level 3 Simulations Meeting

London, UK

ORGANISER

2017

One day meeting at University College London

### CosmoClub

São Paulo, BR

ORGANISER

2014

Journal club and weekly seminars at the Department of Mathematical Physics, University of São Paulo

## Invited Talks

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2022	<b>Talk at GR effects in observing the Large-Scale Structure of the Universe</b> , Universidade do Porto	<i>Porto, PT</i>
2022	<b>Cosmology Seminar</b> , Queen Mary University of London	<i>London, UK</i>
2022	<b>Cosmology Seminar</b> , University of Portsmouth	<i>Portsmouth, UK</i>
2021	<b>Cosmology Group Talk</b> , University of São Paulo	<i>São Paulo, BR</i>
2021	<b>Stobie Talk on Science Funding Crisis in Brazil</b> , University of Edinburgh	<i>Edinburgh, UK</i>
2021	<b>Cosmology Seminar at the PPGCosmo</b> , Federal University of Espirito Santo	<i>Vitória, BR</i>
2021	<b>Talk at the DES Harmonic Space Working Group</b> , Dark Energy Survey	<i>Online</i>
2021	<b>Cosmology Seminar</b> , CosmoStat, Commissariat à l'énergie atomique (CEA)	<i>Saclay, FR</i>
2021	<b>Cosmology Seminar</b> , Max Planck Institute for Astrophysics	<i>Munich, GE</i>
2020	<b>Talk at the Kilo Degree Survey Busy Week</b> , German Centre for Cosmological Lensing	<i>Bochum, GE</i>
2019	<b>Seminar at the Royal Observatory's Coffee Talks</b> , University of Edinburgh	<i>Edinburgh, UK</i>
2019	<b>Seminar at the EEP Group Meeting</b> , University of Sussex	<i>Brighton, UK</i>
2019	<b>Talk at the Spectroscopic Surveys Meeting</b> , University College London	<i>London, UK</i>
2019	<b>Talk at the Euclid Consortium Meeting</b> , University of Helsinki	<i>Helsinki, FN</i>
2018	<b>Talk at the Dark Energy Survey Collaboration Meeting</b> , University of Campinas	<i>Campinas, BR</i>
2018	<b>Astrophysics Seminar</b> , Universidade Federal do Rio Grande do Sul	<i>Porto Alegre, BR</i>
2018	<b>Department of Mathematical Physics Seminar</b> , University of São Paulo	<i>São Paulo, BR</i>
2018	<b>Astrophysics Seminar</b> , National Institute for Space Research	<i>SJ dos Campos, BR</i>
2018	<b>Seminar for UCL's Lunch Talks</b> , University College London	<i>London, UK</i>
2017	<b>Talk at the Dark Energy Survey Collaboration Meeting</b> , University of Chicago	<i>Chicago, US</i>
2018	<b>Talk at the Euclid Consortium Meeting</b> , University College London	<i>London, UK</i>
2017	<b>Talk at the Euclid UK Collaboration Meeting</b> , University of Portsmouth	<i>Portsmouth, UK</i>
2017	<b>Talk at the Euclid OU-LE3 Meeting</b> , Royal Astronomical Society	<i>London, UK</i>
2016	<b>Talk at the Dark Energy Collaboration Meeting</b> , Cambridge University	<i>Cambridge, UK</i>
2015	<b>Talk at the J-PAS Warm-up Meeting</b> , University of São Paulo	<i>São Paulo, BR</i>

## References

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### Prof. Alan Heavens

*Imperial College London*

CHAIR IN ASTROSTATISTICS AND DIRECTOR OF IMPERIAL CENTER FOR COSMOLOGICAL INFERENCE

Contact: a.heavens@imperial.ac.uk

### Prof. Benjamin Joachimi

*University College London*

READER IN ASTRONOMY

Contact: b.joachimi@ucl.ac.uk

### Prof. Andrew Jaffe

*Imperial College London*

PROFESSOR OF ASTROPHYSICS AND COSMOLOGY

Contact: a.jaffe@imperial.ac.uk

### Prof. L. Raul Abramo

*University of São Paulo*

PROFESSOR AT THE MATHEMATICAL PHYSICS DEPARTMENT

Contact: abramo@if.usp.br