

# 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 | 🌐 arthurmloureiro.github.io | 📡 arthurmloureiro | 🐦 @cosmonist

## Research & Work Experience

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### 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)

Apr. 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

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### 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

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**Programming** Advanced Python, Jupyter Notebook, Bash, and Slurm for HPC; intermediate C/C++, Mathematica, SQL.

**Cosmological Codes** CLASS, Hi-CLASS, CAMB, Monte Python, Flask, CCL, Healpix, and Glass (co-developer)

**Peer Reviewer** Journal of Cosmology and Astroparticle Physics, Monthly Notices of the Royal Astronomical Society

**Leadership Roles** PDRA Representative at UCL's Astro Group (2020-2022), Co-Leading Euclid LE3 Weak Lensing Pre-Launch Key Project

## Languages

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**English** Fluent (speaking, reading, writing)

**Portuguese** Native speaker

**French** Intermediate (speaking, reading) and basic (writing)

**Spanish** Basic (writing, speaking, reading)

# Grants & Awards

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## 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

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- 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**, *JCAP*, 08, 2022
- 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, *A&A*, 665, 2022
- 3 *Upper Bound of Neutrino Masses from Combined Cosmological Observations and Particle Physics Experiments*  
**A. Loureiro**, A. Cuceu, et al., *Physical Review Letters*, 123, 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, 2019
- 5 *Fourier analysis of multitracer cosmological surveys*  
L. R. Abramo, L. F. Secco & **A. Loureiro**, *Mon. Notices of the Royal Astronomical Soc.*, 455, 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*)
- 4 T. Castro, A. Fumagalli & Euclid Consortium (incl. **A. Loureiro**) – ArXiv:2208.021774 (*Submitted to A&A*)

# 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

# Teaching Experience

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<b>University of Edinburgh</b>	Edinburgh, UK
TEACHING ASSISTANT - PHD LEVEL	2022
Teaching assistant at the PhD Hackathon on data analysis (2022)	
<b>University College London</b>	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)	
<b>University of São Paulo</b>	São Paulo, BR
TEACHING ASSISTANT - UNDERGRADUATE LEVEL	2014 - 2015
Physical Cosmology (2015), Advanced Quantum Mechanics (2014)	

## **Universidade Federal do Rio Grande do Sul**

TEACHING ASSISTANT - UNDERGRADUATE LEVEL

Porto Alegre, BR

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

2010 - 2013

## **Private**

TUTOR - HIGH-SCHOOL LEVEL

Porto Alegre, BR

Physics & Mathematics for high-school

2011 - 2013

## **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**

Grizedale 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

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

## 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