

DR. CHRISTIAN PEDERSEN

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RESEARCH INTERESTS

Neutrino cosmology, cosmological constraints from the Lyman- α forest, joint analysis of cosmological probes, hydrodynamical simulations, applications of machine learning techniques to cosmology, gravitational wave astronomy

EXPERIENCE

New York University September 2021 - present
Postdoctoral Associate
Topics: Applications of statistical techniques and deep learning to challenges in astrophysics, working with Prof. Shirley Ho

Centre for Computational Astrophysics September 2021 - present
Guest Researcher

EDUCATION

University College London September 2017 - August 2021
Ph.D. in Astrophysics
Thesis title: Neutrino mass and cosmology from the Lyman- α forest
Supervisors: Dr. Andreu Font-Ribera, Prof. Ofer Lahav, Prof. Thomas D. Kitching
Examiners: Prof. Julien Lesgourgues, Prof. Richard Ellis

Cardiff University September 2012 - July 2017
MPhys in Physics with Astronomy, 1:1
Thesis title: Gravitational waves from colliding black holes
Supervisor: Prof. Stephen Fairhurst

Swansea University September 2009 - July 2012
BA in Classics, 2:2

GRANTS AND AWARDS

Visiting Scholars Program - Fermilab May 2021
Small-scale clustering from eBOSS Ly α forests: PI, **\$10,000**

CASPEN exchange programme - Oskar Klein Centre for Cosmoparticle Physics May 2019
Constraining inflation and neutrino masses with the Dark Energy Spectroscopic Instrument at DiRAC Cambridge: Co-PI, **4.5M CPUh**

Modelling of neutrino masses in the Dark Energy Spectroscopic Instrument at DiRAC Cambridge: Co-PI, **0.5M CPUh** March 2018 - March 2019

CUROP Research Internship - Cardiff University June 2016 - August 2016
Topic: Perturbation theory in electrodynamics

RISE Research Internship - Karlsruhe Institute of Technology May 2015 - August 2015
Topic: Ultra-high energy cosmic rays at the Pierre Auger observatory

TECHNICAL SKILLS

Computational skills	Python, Linux/Bash, C/C++, git, LaTeX, High Performance Computing (OpenMP, MPI)
Statistical skills	Bayesian Inference, Markov-Chain Monte Carlo Simulations, Machine Learning (Gaussian Processes, Deep Learning)
Software development	LaCE (Developer), cup1d (Developer), MP-Gadget (Contributor), fake_spectra (Contributor)

PUBLICATIONS

Selected works, exhaustive list [available here](#)

- **C. Pedersen**, A. Font-Ribera, K. K. Rogers, P. McDonald, H. V. Peiris, A. Pontzen, A. Slosar
An emulator for the Lyman- α forest in beyond- Λ CDM cosmologies, [JCAP 2021 \(2021\) 033](#)
- **C. Pedersen**, A. Font-Ribera, T. D. Kitching, P. McDonald, S. Bird, A. Slosar, K. K. Rogers, A. Pontzen
Massive neutrinos and degeneracies in Lyman-alpha forest simulations, [JCAP 2020 \(2020\) 025](#)
- S. Bird, Y. Feng, **C. Pedersen**, A. Font-Ribera
More accurate simulations with separate initial conditions for baryons and dark matter, [JCAP 2020 \(2020\) 002](#)

DEPARTMENTAL AND ACADEMIC DUTIES

Referee for <i>The Astrophysical Journal</i>	since August 2020
Peer mentor for incoming PhD students	September 2018 - June 2019
UCL Cosmology journal club organiser	September 2018 - June 2020
Teaching assistant for module <i>Practical Physics & Computing</i>	September 2017 - December 2019

TALKS

DESI virtual collaboration meeting - Lya session talk	June 2021
Cosmology seminar, UC Riverside	January 2021
Cosmology X Data Science group meeting talk, Flatiron Institute	December 2020
DESI virtual Lyman- α forest meeting	July 2020
DESI-AI forum	June 2020
DESI virtual collaboration meeting - Lya session talk	March 2020
UCL lunch talk	November 2019
DESI collaboration meeting, Berkeley Lab	July 2019
Cosmology seminar, Oskar Klein Centre for Cosmoparticle Physics	May 2019
<i>IGM 2018</i> at Kavli IPMU Tokyo	September 2018
Neutrinos@UCL Workshop	June 2018
Astro group meeting talk, Mullard Space Science Laboratory	April 2018
DESI France meeting	January 2018

OUTREACH

Bounce Back Project

Nov 2019

Prepared for material for a presentation on black holes for inmates at Brixton Prison

UCL Physics summer school

July 2018

Mentor at a week long summer school for high school students, supervised experiments using spectrographs and diffraction gratings

Kathleen Lonsdale Building opening day

March 2018

Presentation on cosmoparticle physics with a cloud chamber demonstration to several groups of VIPs, including Sir David Attenborough

REFERENCES

Dr. Andreu Font-Ribera, *Institut de Fisica d'Altes Energies, Barcelona* - afont@ifae.es

Prof. Shirley Ho, *Flatiron Institute, New York* - shirleyho@flatironinstitute.org

Prof. Nickolay Gnedin, *Fermilab, Illinois* - gnedin@fnal.gov

Dr. Anže Slosar, *Brookhaven National Laboratory, New York* - anze@bnl.gov