CHRISTIAN PEDERSEN

chrisp@star.ucl.ac.uk - https://chris-pedersen.github.io/

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

EDUCATION

University College London September 2017 - March 2021
Ph.D. in Astrophysics
Topics: Hydrodynamical simulations of the Lyman-α forest, neutrino cosmology
Supervisors: Andreu Font-Ribera, Ofer Lahav, Thomas D. Kitching

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

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

GRANTS AND AWARDS

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** March 2019 - March 2020

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

PUBLICATIONS

Selected works, exhaustive list available here

- **C. Pedersen**, A.Font-Ribera, P. McDonald, H. V. Peiris, A. Pontzen, K. K. Rogers, A. Slosar
  Cosmology from the Lyman-α forest: A general emulator for the 1-D flux power spectrum, (in prep. to be submitted Nov. 2020)
- **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

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)
Software development	LaCE (Developer), MP-Gadget (Developer), cup1d (Developer), fake_spectra (Contributor)

DEPARTMENTAL AND ACADEMIC DUTIES

Referee for *The Astrophysical Journal*	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 *Practical Physics & Computing*	September 2017 - December 2019

OUTREACH

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

TALKS

DESI virtual Lyman-α forest meeting	July 2020
DESI-AI forum	June 2020
DESI virtual collaboration meeting	March 2020
DESI Lyman-α telecon	December 2019
UCL lunch talk	November 2019
DESI UK meeting	October 2019
DESI collaboration meeting, Berkeley Lab	July 2019
Cosmology seminar, Oskar Klein Centre for Cosmoparticle Physics	May 2019
IGM 2018 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

REFERENCES

Dr. Andreu Font-Ribera, *Institut de Fisica d'Altes Energies, Barcelona* - afont@ifae.es
Prof. Andrew Pontzen, *University College London, London* - a.pontzen@ucl.ac.uk
Dr. Anže Slosar, *Brookhaven National Laboratory, New York* - slosar@bnl.gov