NICHOLAS CHOUSTIKOV

1st year DPhil Student striving to better simulate universes

I'm interested in studying both *small* scales (magnetised gas accretion onto black holes and active galactic nuclei (AGN) feedback) and *large* scales (reionization and perturbation theory of large scale structure) using a variety of numerical and analytical techniques

CONTACT

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NASA/ADS publication list

SKILLS

Programming

Python
Fortran
C++
Bash
MATLAB
LaTeX
Mathematica

Software & Tools

RAMSES
Einstein Toolkit
HPC
DIaL3, Cosma8, AWS,...
Visualisation
(e.g. matplotlib, VisIt, ...)
Data handling/analysis
(e.g. numpy, scipy, pandas, ...)
Microsoft Office

Operating Systems

Linux
MacOS
Windows

Unrelated technical skills

Trained to operate class 3B & 4 lasers
Proficient solderer

Languages

English
Russian
French
German

OTHER INTERESTS

Eton Fives (sport)
Oxford Half Blue: 2023; Cambridge Half Blue: 2022, 2021, 2020, 2019; London Plate winner 2022; Kinnaird Festival winner 2021

Squash (sport)
Oxford Cuppers winner 2023, Cambridge Cuppers finalist 2019, Represented University of Cambridge

Photography

EDUCATION

10/2022 - Present
University of Oxford
Mansfield College
DPhil in Astrophysics

Supervisors: Professor Julien Devriendt and Professor Adrianne Slyz
Funding: Full STFC Studentship

09/2018 - 07/2022
University of Cambridge
Fitzwilliam College
BA + MSci in Natural Sciences

Grade: Double First Class with Distinction (85%)
Masters Supervisors: Dr Zvonimir Vlah and Professor Anthony Challinor
Courses: Astrophysical Fluid Dynamics, General Relativity, Black Holes, Galaxy Formation, Cosmology, Modern Stellar Dynamics, Quantum Field Theory, Field Theory in Cosmology

PUBLICATIONS

» **Optimizing the Evolution of Perturbations in the ΛCDM Universe (*Submitted to Phys. Rev. D*)**

N. Choustikov, Z. Vlah and A. Challinor

» **The Physics of Indirect Estimators of Lyman Continuum Escape and their Application to High-Redshift JWST Galaxies (*submitted to MNRAS*)**

N. Choustikov, H. Katz, A. Saxena, A. J. Cameron, J. Devriendt, A. Slyz, J. Rosdahl, J. Blaizot and L. Michel-Dansac

» **The Einstein Toolkit: A Student's Guide (2020)**

N. Choustikov

RESEARCH EXPERIENCE

10/2022 - Present
Department of Physics, Oxford
DPhil Research

Title: **The impact of magnetic fields on gas accretion onto supermassive black holes and AGN feedback: the next frontier of galaxy formation cosmological simulations**
» Building sub-grid models of magnetised AGN in RAMSES.
» Post-processing cosmological simulations to study reionization.

06/2022 - 09/2022
Dr. Z. Vlah, IoA, Cambridge
Kavli Research Internship

» Extended Masters' research to include quintessence models of dark energy.

06/2021 - 09/2021
Prof. Kinwah Wu, MSSL, UCL
Summer Research Internship

» Simulated a binary neutron star merger to study the propagation of QCD phase transitions.

06/2020 - 09/2020
Personal Project
Summer Research Project

» Taught myself to simulate binary black hole mergers using the Einstein Toolkit on AWS.

AWARDS AND SOCIETIES

1912 Senior Scholarship + Foundation Scholarship – *2022*

Rawlins Prize (best computational project) – *2021*

Elected Fellow of Royal Astronomical Society (FRAS) – *2020*

REFERENCES

Professor Julien Devriendt
Professor Adrianne Slyz
Professor Anthony Challinor