

Curriculum vitae - Iustin Surubaru

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Education

October 2019 – July 2023	University of Oxford, Master of Mathematical and Theoretical Physics Expected classification: Strong First class/Distinction
Relevant courses	Quantum field theory, Topological quantum field theory, Supersymmetry and Supergravity, String theory, Representation theory, Conformal field theory, General relativity, Standard Model and beyond
Research interests	My research interests are broadly spread between geometry, from either an algebraic or topological perspective, and structures that arise in quantum field theories or string theory. I am also interested in holography and the AdS/CFT duality and beyond standard model phenomenology applied to cosmology. I am currently working on a dissertation regarding aspects of higher generalized symmetries and their implications for gauge theories.

Awards and examination results

2020, 2021, 2022	Elected University of Oxford Scholar by the academic board of New College
2020	Awarded the Burden Griffiths prize for the performance in First year Prelims Examination
2020	Ranked sixth in First year Prelims Examinations
2021	Ranked top 10% in Second year Part A Examinations
2022	Ranked top 5% in Third year Part B Examinations (Top 10 students in the year)

Computational skills

Good knowledge and experience with numerical methods and data analysis such as ODE solvers, regressors, recursion methods in Python and Matlab

Intermediate knowledge of C++ and Arduino. Programmed a sudoku application in C# and programmed motion, temperature and humidity sensors in Arduino to extract relevant data about the environment

Basic knowledge of Mathematica and completed a course on Machine learning programming and methods in Python

Research experience

June 2022 – August 2022 **Summer research intern, Rudolf Peierls Centre for Theoretical Physics, University of Oxford**

The aim of the project was to understand the behavior of gravitational waves emitted by cosmic string networks created at the end of the inflation period. The large scales evolution of radiation density leads to a scenario where gravitational radiation dominates the energy of the Universe. This resolution offers a possible solution for the overshoot problem. I used cosmological perturbation methods and phenomenological aspects of cosmic string networks to model the evolution of the metric and the possibility of collapse into primordial black holes. The project was supervised by Prof Joseph Conlon, University of Oxford

August 2022 **Participant in the Scattering Theory Summer School, Gdansk University of Technology**

The courses specialized on describing electron-atom collisions and spin polarization phenomena using relativistic wave equations (Mott theory, Froehlich theory and Ritchie theory). The gained knowledge has been further applied to understanding experimental methods in electron atom/molecule collisions such as Ramsauer techniques.

November 2021- April 2022 Research on analytical modelling and numerical extensions for ISCO and homoclinical geodesics in Schwarzschild and Kerr geometries. The project was supervised by Prof Steven Balbus, University of Oxford

Additional Experience

2017 Participant in the HYPATIA project organized by CERN. I used the ATLANTIS program to analyze collision events and identify collision products.

2021-Present EasyA tutor. I help UK GCSE and A levels students with science questions from their syllabus outside school hours.

Languages

Romanian (native)
English (fluent)
French (basic level)