

Andrei-Cătălin Popa

EMJM ASTROPHYSICS AND SPACE SCIENCE STUDENT

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Education

Università degli Studi di Roma "Tor Vergata"

Rome, Italy

MSC IN ASTROPHYSICS AND SPACE SCIENCE

Sept. 2024 - present

Erasmus Mundus Joint Master Programme in Astrophysics and Space Science (MASS) jointly delivered by a consortium of four Universities: Rome "Tor Vergata", Belgrade, Bremen, and Côte d'Azur

- **Key modules:** Quantum Mechanics, Mathematical Methods, Radiative Processes, Modern Astrophysics, Numerical Methods

University College London

London, United Kingdom

MSci IN PHYSICS (FIRST CLASS HONOURS)

Sept. 2018 - Jun. 2022

Thesis: Hunting for Intermediate-Mass Black Hole Binaries... or the fun of looking for the needle in a haystack

Master's Thesis Advisors: Prof. Daisuke Kawata

- Achieved final result of 73%, showcasing unwavering commitment and enthusiasm for physics and astronomy, dedicating the final year to the study of astrophysics. Engaged in practical demonstrations involving observations at the UCL Observatory in Mill Hill, London.
- **Key modules:** General Relativity, Statistical Physics, Nuclear and Particle Physics, Advanced Cosmology, Exoplanets, Solid State Physics, Galaxy Dynamics, Formation and Evolution, Computing for Physics, Quantum Mechanics, Mathematical Methods for Physics, High Energy Astrophysics

Past Research Experience

MSci Project: Hunting for Intermediate-Mass Black Hole Binaries... or the fun of looking for the needle in a haystack

London, UK

UNIVERSITY COLLEGE LONDON

Oct. 2021 - March. 2022

Intermediate Mass Black Holes (IMBH) are still one of the big mysteries in astronomy and astrophysics as so far there is no evidence of the existence of black holes with masses between $100 M_{\odot}$ and $10^5 M_{\odot}$.

- Supervised by Prof. Daisuke Kawata - analysing the behaviour of IMBHs and investigating their interaction with a stellar companion.
- Literature review of detection methods for black holes, focussing on non-interacting binary systems composed of a black hole and a star.
- Calculations of physical constraints of the orbital parameters and inspection of star viability based on its stellar classification.
- Developed custom Python code to automate mass analysis for binary system and produce astrometric tracks for IMBH-star systems.
- Correlating the results with the ongoing mission results such as Gaia and making prediction for the upcoming JASMINE mission.

Group Project: VOC Analysis For Disease Detection : A Critical Assessment Of Non-Invasive Screening Methods

London, UK

UNIVERSITY COLLEGE LONDON

Jan. 2021 - Mar. 2021

Achieved 76.81% in the third-year Physics group project, investigating the real potential of volatile organic compounds as a better non-invasive detection method of COVID-19 and various other bio-markers.

- Supervised by Prof. Gaetana Laricchia - analysing volatile organic compounds for medical diagnostics.
- Literature review of promising detection methods such as ion mobility spectrometry, electronic noses or MALDI.
- Performed analysis of various diseases which emit bio-markers in the form of VOCs such as cancers, COVID-19 or Alzheimer's disease.
- Produced group project, poster, and presentation, including a new device proposal for quickly detecting VOCs.

Relevant Work Experience

Outreach Intern

London, UK

DEPARTMENT OF PHYSICS AND ASTRONOMY, UCL

Jun. 2022 - Sept. 2022

- Organized outreach events within the local schools' community.
- Planned, directed, or coordinated activities to raise awareness of the research and activities.
- Helped run UCL's scientific activities throughout the festival called 'Your Universe.'

Summer Physics Teaching Intern

EASTBURY COMMUNITY SCHOOL, BARKING

Barking, UK

Jun. 2022 - Jul. 2022

- Taught STEM-related classes and helped run the Science Club.
- Created materials and resources based on the A-level Physics sheets.
- Assisted teachers in ensuring students are engaged in their work and answering questions.

Demonstrator

UCL OBSERVATORY

Mill Hill, UK

Oct. 2019 - Sept. 2022

- Trained to operate robotic 14-inch Schmidt-Cassegrain, twin 24/18-inch refractors and a manual 8-inch refractor.
- Conducted public tours for groups of amateur stargazers, primary school students or general public.
- Improved the ability to communicate complex scientific information to the general public. Applied knowledge gained in lectures to explain diverse physics and astrophysics-related topics.

Extracurricular Activities

Tutor and Co-founder

ASTRONOMY AND ASTROPHYSICS CLUB

Constanta, Romania

Sept. 2016 - Sept. 2022

- Founded the Astronomy and Astrophysics Club to increase interest in Astronomy among secondary and high-school students in my city. Run weekly meetings with the student.
- Organized an annual contest for the members of the club. The contest expanded to include students throughout the entire country.
- Developed and taught introductory courses in Astronomy. Prepared advanced students for the National Phase of Astronomy Olympiad.

Treasurer

ENGINEERS WITHOUT BORDERS, UCL

London, UK

Jun. 2020 - Sept. 2021

- Developed the yearly society budget. Managed and monitored the finances of the society throughout the year. Liaised with Students' Union on funding and financial issues.
- Previously involved as workshop executive during 2019/2020 academic year. Designed, created, organised, and ran workshops aimed at enhancing understanding of hands-on engineering.

Mentor

ASTRONOMY AND ASTROPHYSICS STUDENT CAMP, ȘTEFAN CEL MARE UNIVERSITY

Suceava, Romania

Jan. 2020

- Selected to be one of the few mentors, without formal teaching qualifications, to help with organizing and running the National Astronomy and Astrophysics Camp in Romania.
- Coordinated a group of more than 20 high school students throughout the duration of the camp.
- Organized and ran workshops in Astronomy. Taught intermediate and advanced courses in Astronomy.
- Wrote and proposed problems for the Astronomy contest. Graded students' papers. Assessed presentations.

Skills & Professional Services

Programming Python (AstroPy, Pandas, Numpy, SciPy, Matplotlib), Machine Learning (Scikit-learn, Keras), Mathematica

Miscellaneous \LaTeX , Git, Jupyter, Colab, UNIX (Ubuntu), MS Office, Data Visualisation and Analysis Software

Languages **English:** Fluent; **Romanian:** Native; **French:** Intermediate; **Italian:** Beginner