

CHRISTOS XENOFONTOS

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PROFILE

Marie Skłodowska-Curie Actions Fellow (MSCA) and Ph.D. candidate in Atmospheric Sciences at The Cyprus Institute. My research investigates how anthropogenic ammonia (NH_3) emissions influence upper-tropospheric aerosol formation and climate. I use the EMAC Earth system model, integrating mechanisms from the CLOUD experiment at CERN. Secondments at the Max Planck Institute for Chemistry and CERN (CLOUD experiment). Published in high-impact journals including *PNAS* and *Nature*, and reviewed manuscripts for *Environmental Science & Technology*.

EDUCATION

THE CYPRUS INSTITUTE, Nicosia, Cyprus

PhD in Energy, Environment and Atmospheric Sciences

2023 – 2026

Research Project: Anthropogenic NH_3 in the Upper Troposphere: Global Impact on Particle Formation and Its Role in the Asian Tropopause Aerosol Layer

UNIVERSITY COLLEGE LONDON, London, England

MSc Planetary Science

2021 – 2022

Degree Classification: Distinction

Research Project: Simulating the performances of ARIEL and JWST in probing the Atmospheres of Planets in the Radius Gap

IMPERIAL COLLEGE LONDON, London, England

MSc Physics

2020 - 2021

Degree Classification: Distinction

Research Project: Inertial Stability and the Behaviour of Tropical Cyclones

IMPERIAL COLLEGE LONDON, London, England

BSc Physics

2017 - 2020

Degree Classification: Upper Second Class Honours

Research Project: Sonoluminescence- Generating Light from acoustically-driven bubbles

THE ENGLISH SCHOOL, NICOSIA, Nicosia, Cyprus

High School Diploma

2010 - 2016

A Levels: Physics (A*), Mathematics (A*), Further Mathematics (A*), Biology (A), Modern Greek (A)

IGCSEs: 6A*, 1A, 2B

RESEARCH ACHIEVEMENTS & PEER RECOGNITION

Achievements Summary

I quantify the global impact of anthropogenic NH_3 on new particle formation (NPF) in the upper troposphere, where aerosols shape cloud properties and climate. Using Earth system modeling and CLOUD-derived NPF mechanisms, I show that NH_3 —transported by convection from agricultural sources—enhances aerosol formation through interactions with sulfuric and nitric acids. Simulations reveal that anthropogenic NH_3 increases cloud-forming particle concentrations by up to $2.5\times$ over high-emission regions and raises aerosol optical depth by as much as 80%, amplifying climate effects. This work advances NH_3 -driven NPF representation in global models, improving climate projections and informing policy.

Publications

1. Xenofontos, Christos, et al. "Global impact of anthropogenic NH_3 emissions on upper tropospheric aerosol formation." *Proceedings of the National Academy of Sciences* 122.44 (2025): e2506658122.
2. Xenofontos, Christos, et al. "The impact of ammonia on particle formation in the Asian Tropopause Aerosol Layer." *npj climate and atmospheric science* 7.1 (2024): 215.
3. Russell, Douglas M., et al. "Isoprene chemistry under upper-tropospheric conditions." *Nature Communications* 16.1 (2025): 8555.
4. Bhattacharyya, Nirvan, et al. "Isoprene Aerosol Growth in the Upper Troposphere: Application of the Diagonal Volatility Basis set to Cloud Chamber Measurements." *ACS ES & T Air* 2.10 (2025): 2092-2104.

- Shen, Jiali, et al. "New particle formation from isoprene under upper-tropospheric conditions." *Nature* 636.8041 (2024): 115-123.

Secondments

- CERN CLOUD experiment.** Supported experimental campaigns through night shifts and contributed to planning discussions (Geneva, 2023-2026)
- Airmodus Ltd.** Three-week secondment to enhance the Airmodus PSM inversion tool in Python, improving user interface legibility, adding error metrics, and refining data visualization (Helsinki, 2024)
- Max Planck Institute for Chemistry.** Two-month collaboration developing the EMAC model setup for simulating atmospheric particle formation and evaluating its climate impact (Mainz, 2023)

Awards and Recognition

- My PNAS publication received broad media recognition, including release and promotion through **official PNAS channels**, as well as significant engagement across platforms such as **Twitter, LinkedIn, and Bluesky** (2025)
- Marie Skłodowska Curie Actions (MSCA) CLOUD-DOC Fellowship** (EU-2023)
- Ogden Prize:** Awarded annually to **one student** to recognise outstanding achievement in the **Communicating Physics** course. (Imperial College London - 2019)
- Because of the Ogden Prize, my name was written into the memory of the magnetometer instrument of the Solar Orbiter spacecraft. (Imperial College London - 2019)

Conferences

- COMECAp.** Oral presentation on *Impact of Anthropogenic NH₃ on UT Aerosol*, Nicosia, Cyprus (2025)
- ICNAA.** Oral presentation on *Impact of Anthropogenic NH₃ on UT Aerosol*. **Session Chair**, Vienna, Austria (2025)
- EGU General Assembly.** Oral presentation on *Anthropogenic NH₃ Impact on UT Aerosol Composition and Climate Forcing*, Vienna, Austria (2025)
- EAC.** Oral presentation on *the impact of NH₃ on particle formation in the Asian Tropopause Aerosol Layer*, Tampere, Finland (2024)
- EGU General Assembly.** Poster on *Modelling the Impact of NH₃ Emissions on NPF in the Asian Monsoon UT*, Vienna, Austria (2024)

POSITION OF RESPONSIBILITY

THE CYPRUS INSTITUTE

Student Representative

Nicosia, Cyprus

2024-2026

- Represented student interests at the Graduate School level, participating in academic and institutional decision-making
- Organized student-led events, fostering academic engagement and community-building
- Supported student well-being and productivity through peer outreach and feedback mechanisms
- Acted as liaison between students and faculty, ensuring transparent communication and leadership representation

CLOUD COLLABORATION

CLOUD-DOC Student Representative, Paper Committee

CERN, Switzerland

2023-2026

- Reviewed and provided feedback on student paper drafts to uphold scientific clarity
- Ensured accuracy of author lists, affiliations, and acknowledgements across CLOUD publications
- Represented doctoral students in discussions with senior researchers on publication planning and policy

ADDITIONAL SKILLS

- Languages:** Greek (native), English (native), French (IGCSE)
- Programming & Modelling:** Python, Fortran, Earth system model development (EMAC), HPC environments, Unix/Linux
- Software & Tools:** Microsoft Office (Word, Excel, PowerPoint), Git, LaTeX
- Certifications:** Python Programming – Coursera & Python Institute Certified
- Teaching:** Guided final year physics students to win gold and silver medals in Physics Olympiads (Chelsea Academy, London)
- Other:** Experience with large-scale simulations, data analysis, and collaborative research workflows

WEBSITES

- Personal Website:** <https://cxenofontos.github.io/>
- ORCID:** <https://orcid.org/0009-0004-7637-5199>
- ResearchGate:** <https://www.researchgate.net/profile/Christos-Xenofontos-3>
- Google Scholar:** <https://scholar.google.com/citations?hl=en&user=octjPQYAAAAJ>

References available upon request