

## Raphaëlle Péguilhan

**PhD - Atmospheric Sciences (Microbial Ecology & Bioinformatics)**

**Current position:** Postdoctoral researcher

**Nationality:** French

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**Metrics:** 8 publications, 2 preprints, H-index: 8 with 289 citations (Google Scholar)

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## Professional Experience

<b>01/05/2026 up to now</b>	<b>Postdoctoral Researcher – MSCA-PF grant</b> Department of Biology, Microbiology section, Aarhus University – Aarhus, Denmark
Focus	Integrins in Arctic Air: Exploring the drivers behind integron diversity in the Arctic atmosphere and integron integrase gene expression under simulated atmospheric conditions.
Supervisor	Dr. Tina Santl-Temkiv
Activities	<ul style="list-style-type: none"><li>• Processing of short-read metagenomic dataset and genome mining to detect integrins.</li><li>• Designing reporter strains for the expression of the SOS response and different promoters of integron integrase genes.</li><li>• Performing aerosolization experiments with atmospheric chambers and following fluorescence emission.</li></ul>
<b>01/05/2024 to 30/04/2026</b>	<b>Postdoctoral Researcher</b> Department of Chemical Engineering, Technical University of Denmark – Kgs. Lyngby, Denmark
Focus	Investigating syntrophic interactions between methanogenic archaea and bacteria in anaerobic microcosms.
Supervisor	Dr. Irini Angelidaki
Activities	<ul style="list-style-type: none"><li>• Genome mining for auxotrophies and syntrophic possible interactions on MAGs.</li><li>• Performing enrichment on anaerobic mixed cultures.</li><li>• Following abundance of the species of interest by qPCR.</li><li>• Pangenomic analysis of <i>Methanosarcina</i> genomes.</li></ul>
<b>01/03/2023 to 29/02/2024</b>	<b>Temporary lecturer</b> Institut des Sciences Analytiques et de Physico-Chimie pour l'Environnement et les Matériaux – IPREM UMR5254 – UPPA/CNRS, Pau, France
Focus	Investigate the presence of siderophore biosynthetic gene clusters (BGCs) in metagenomic and metatranscriptomic datasets from peatland environment.
Supervisor	Dr. Béatrice Lauga
Activities	<ul style="list-style-type: none"><li>• Processing of metagenomic (MG) and metatranscriptomic (MT) data from peatland environment (Illumina and PacBio sequencing).</li><li>• Search of siderophore biosynthesis gene clusters (BGCs) in MG and MT datasets through detection of Hidden Markov model (HMM)-based method.</li><li>• Supervision during four months of a Master level student (volunteer internship financed by the TLN Mobilicat programme) on the detection of integron and gene cassette sequences in MG and MT datasets.</li></ul>

	<ul style="list-style-type: none"> <li>Teaching activities: 50 hours of lectures and tutorials (in English) in introductory bioinformatics for Master students.</li> </ul>
<b>01/03/2019 to 16/09/2022<sup>1</sup></b>	<b>PhD fellow</b>
	Institut de Chimie de Clermont-Ferrand – ICCF UMR6296 – UCA/CNRS, Clermont-Ferrand, France.
Focus	Clouds as atmospheric oases: comparative analyses of clouds and dry aerosols in terms of microbial diversity and functional profile to explore the specificities of clouds as particular microbial habitats in the atmosphere due to the presence of liquid water.
Supervisor	Dr. Pierre Amato
Activities	<ul style="list-style-type: none"> <li>Field sampling of clouds, aerosols, and precipitation. Preparation of the material for sampling campaigns.</li> <li>Sample processing: DNA and RNA extraction, PCR amplification, DNA quantification, cell count by flow cytometry, ATP quantification by fluorescence.</li> <li>Processing of Illumina sequencing data from amplicon sequencing, metagenomics (MG) and metatranscriptomics (MT).</li> <li>Development of a new bioinformatics workflow (based on existing tools) for the simultaneous processing of MT and MG environmental data. I initiated a collaboration with the Galaxy Europe team at the Freiburg University to improve the bioinformatics workflow and make it publicly available on the Galaxy Europe server.</li> </ul>

### *Education and diploma*

<b>01/03/2019 to 16/09/2022<sup>1</sup></b>	<b>Ph.D. in Atmospheric Sciences.</b> Obtained on September 16, 2022
Thesis	Clouds as Atmospheric oases.
Supervisor	Dr. Pierre Amato
Institutions	Institut de Chimie de Clermont-Ferrand – ICCF UMR6296 – UCA/CNRS, Clermont-Ferrand, France. Université Clermont Auvergne (UCA), Clermont-Ferrand, France.
<b>01/09/2016 to 29/06/2018</b>	<b>Master's degree in Genomics and Environment</b>
Institution	Université Paris-Saclay, Versailles-Paris, France
Mention	High honours
Internship Institution	Institut National de la Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE), Jouy-en-Josas, France.
Internship thesis (6 months)	Comprehension of metabolic mechanisms of meat product spoilage from « multi-omics » analysis of a synthetic microbial community.
<b>01/09/2013 to 01/07/2016</b>	<b>Bachelor's degree in Biology and Environment</b>
Institution	Université Versailles Saint-Quentin-en-Yvelines (UVSQ), Versailles, France.
Mention	Honours

<sup>1</sup> I was granted a three-month extension by my doctoral school due to the COVID epidemic, and then a further three-month extension as an engineer to complete my PhD.

## Skills and competences

<b>Molecular biology</b>	DNA/RNA extraction, PCR, qPCR, reporter strain transformation.
<b>Microbiology</b>	Culturing and isolation of heterotrophic, aerobic and anaerobic bacteria, quantification of microbial cells by flow cytometry, ATP quantification by fluorescence.
<b>Bioinformatics</b>	Biodiversity profiling, metagenomics, metatranscriptomics, genome mining, processing of Illumina and PacBio sequencing data, and use of computing clusters.
<b>Programming</b>	Experienced user in R, Bash and Slurm.
<b>Field sampling</b>	Atmospheric (rain, clouds, aerosols) and peatland sampling.
<b>Languages</b>	English (C1 Advanced user) French (Mother language)
<b>Management activities</b>	Experience in field campaign organization: preparation of the material, monitoring, and pooling analysis results for sharing with collaborators from different institutions. Experience in initiating collaborations. I was also part of the Early career advisory committee of the “Microbes Initiative” at the Technical University of Denmark (DTU).

## Publications

- Mathonat F., Enault F., **Péguilhan R.**, Joly M., Théveniot M., Baray J-L., Ervens B. and Amato P. (2026). *Bacterial contribution to nitrogen processing in the atmosphere*. Biogeosciences. DOI: 10.5194/bg-23-2885-2026.
- Péguilhan R.**, Rossi F., Joly M., Nasr E., Batut B., Enault F., Ervens B. and Amato P. (2025). *Clouds influence the functioning of airborne microorganisms*. Biogeosciences. DOI: 10.5194/bg-22-1257-2025.
- Ervens B., Amato P., Aregahegn K., Joly M., Khaled A., Labeled-Veydert T., Mathonat F., Nuñez López L., **Péguilhan R.**, Zhang M. (2025). *Ideas and perspectives: Microorganisms in the air through the lenses of atmospheric chemistry and microphysics*. Biogeosciences. DOI: 10.5194/bg-22-243-2025
- Nasr E., ....., **Péguilhan R.**, ..., microGalaxy Community, Zierop P, Batut B. (2024). *Microbiology Galaxy Lab: The first community-driven gateway for reproducible and FAIR analysis of microbiological data*. bioRxiv. DOI: 10.1101/2024.12.23.629682.
- Péguilhan R.**, Rossi F., Rué O., Joly M., Amato P. (2023) *Experimental and methodological framework for the assessment of nucleic acids in airborne microorganisms*. Preprint bioRxiv. DOI: 10.1101/2023.10.10.561683.
- Amato P., Mathonat F., Nuñez Lopez L., **Péguilhan R.**, Bourhane Z., Rossi F., Vyskocil J., Joly M. and Ervens B. (2023). *The aeromicrobiome: the selective and dynamic outer-layer of the Earth’s microbiome*. Front. Microbiol. 14:1186847. DOI: 10.3389/fmicb.2023.1186847.
- Péguilhan R.**, Rossi F., Rué O., Joly M., Amato P. (2023). *Comparative analysis of bacterial diversity in clouds and aerosols*. Atmospheric Environment, vol 298. DOI: 10.1016/j.atmosenv.2023.119635.
- Rossi F., **Péguilhan R.**, Turgeon N., Veillette M., Baray J-L., Deguillaume L., Amato P., Duchaine C. (2023). *Quantification of antibiotic resistance genes (ARGs) in clouds at a mountain site (puy de Dôme, central France)*. Science of the Total Environment, vol 865. DOI: 10.1016/j.scitotenv.2022.161264.
- Péguilhan R.**, Besaury L., Rossi F., Enault F., Baray J., Deguillaume L., and Amato P. (2021). *Rainfalls sprinkle cloud bacterial diversity while scavenging biomass*. FEMS Microbiol. Ecol. 1–15. DOI: 10.1093/femsec/fiab144.
- Poirier S., Rué O., **Péguilhan R.**, Coeuret G., Zagorec M., Champomier-Vergès M.C., Loux V., and Chaillou S. (2018). *Deciphering intra-species bacterial diversity of meat and seafood spoilage microbiota using gyrB amplicon sequencing: A comparative analysis with 16S rDNA V3-V4 amplicon sequencing*. PLoS One 13. DOI: 10.1371/journal.pone.0204629.

## Supervising and teaching activities

- Supervision of PhD students for the processing of short reads metagenomic data at DTU (kgs. Lyngby, Denmark) (2024-2025).

- Supervision of a Master level student at 100% during four months at IPREM (Pau, France) (2023). This was a volunteer internship financed by the TLN Mobilicat programme and was on the detection of integron sequences in metagenomic and metatranscriptomic datasets from peatland samples.
- 50 hours of lectures and tutorials (in English) in introductory bioinformatics for Master's students at UPPA (Pau, France) (2023).
- 80 hours of practical courses in “Biodiversity of living organisms” for undergraduates at UCA (Clermont-Ferrand, France) (2020-2022).
- Annual conference on aeromicrobiology and my career (2 hours) to undergraduate students at UVSQ (Versailles, France) as a temporary lecturer (2020-2026) and at UPPA (Pau, France) (2024-2026).

### *Grants and fundings*

- HORIZON-MSCA-2024-PF-01, project 101199145 – IntegrAAir. Starting May 1, 2026.

### *Awards*

- Best poster award at the 13<sup>th</sup> International Symposium on Anaerobic Microbiology, **ISAM2025** (Sept 2025)

### *Public dissemination activities*

- Flash talk of 2 min at the Annual Biology Day of Aarhus University Department of Biology. June **2026**. Aarhus, Denmark.
- Flash talk of 5 min at the INTIME workshop. June **2026**. Fjerritslev, Denmark.
- Two poster presentations at the 13<sup>th</sup> International Symposium on Anaerobic Microbiology (**ISAM2025**). September **2025**. Leipzig, Germany.
- Poster presentation at the Environmental and Agronomical Genomics Symposium (**EAGS2024**). February **2024**. Toulouse, France.
- Oral presentation (invited speaker) at Eco-Evo (Ecology and Evolution) scientific seminar organized by Clermont-Ferrand University related laboratories, CNRS. December **2022**. Clermont-Ferrand, France.
- Oral presentation (invited speaker) at the scientific seminar organized by the LMGE laboratory, Université Clermont Auvergne, CNRS. July **2022**. Clermont-Ferrand, France.
- Oral presentation at a seminar organized by the Bioinformatics platform of Clermont-Ferrand (AuBi) around NGS data processing. December **2021**. Clermont-Ferrand, France.
- Poster presentation at the “Journées Ouvertes en Biologie, Informatique et Mathématiques” (**JOBIM**), French congress on biology, bioinformatics and mathematics. July **2021**. Remote presentation.
- Poster presentation at the **World Microbe Forum**, a FEMS and ASM collaboration. June **2021**. Remote presentation.
- Oral presentation at the 17<sup>th</sup> Clermont-Ferrand Microbiologists' seminar. April **2021**. Clermont-Ferrand, France. Remote presentation.
- Oral presentation European Geosciences Union (**EGU**) General Assembly **2020**. May 2020. Remote presentation.