



ARISTO – PhD Fellowship

ARISTO: The European Industry - Academia Network for Revising and Advancing the Assessment of the Soil Microbial Toxicity of Pesticides

PhD scholarship in Environmental Microbiology & Ecology

Ecole Centrale de Lyon, University of Lyon, France & NCIMB Ltd., Scotland UK.

Ecole Centrale de Lyon and NCIMB Ltd. are offering a PhD scholarship in environmental microbiology with expected commencement March 2021 or as soon as possible thereafter. The PhD will be awarded by the Ecole Centrale de Lyon, France.

Project title: *In vitro* assessment of the toxicity of pesticides on ammonia oxidising microorganisms

Project description

Nitrification is the microbial conversion of ammonium to nitrate and a key process in the global nitrogen cycle. In soil these reactions are mediated by two autotrophic functional groups of nitrifying microorganisms (ammonia oxidizers microorganisms (AOM) and nitrite-oxidizing bacteria (NOB)) or in one cell by complete ammonia oxidisers (comammox). As the activity of these organisms is essential for soil health, they are ideal candidates for testing the impact of pesticides on microbial communities and soil ecosystem functioning. The PhD programme will determine the ecotoxicological response of AOM as microbial indicators of pesticides toxicity. The objectives of the programme are to (i) to establish, optimize and standardize *in vitro* assays for assessing the toxicity of pesticides on AOM, (ii) to identify toxicity on other microorganisms participating in the nitrification process, (iii) to explore the toxicity mechanisms of pesticides on AOM. The work will utilize both cultivated nitrifier populations and soil microcosm incubations requiring the use of molecular ecology approaches (quantitative PCR, amplicon sequencing). The programme will also develop a novel screening platform for the analysis and determination of the functional health of soils and other environmental samples in response to pesticide amendment.

The PhD position is associated to a larger European training network, ARISTO (<https://aristo.bio.uth.gr>), funded by the European Commission for 48 months. The ARISTO project offers 8 other PhD positions at other participating institutions. We strongly encourage candidates to also apply for other similar positions within the ARISTO network.

Principal supervisor: Prof. Graeme Nicol (graeme.nicol@ec-lyon.fr, +33 472 18 60 88) and Dr Carol Phillips (c.phillips@ncimb.com, +44 1224 009333).

Planned secondments: Three months at the DSMZ (German Collection of Microorganisms and Cell Cultures), Supervisor: Dr. Michael Pester. Purpose: to receive training on the cultivation and testing of pesticides toxicity on NOB and other AOM to expand the range of microorganisms tested.

Brief Project Description

ARISTO is an International Training Network (ITN) funded by the European Union's Horizon 2020 research and innovation programme under Marie Skłodowska-Curie grant agreement. Pesticides are major environmental pollutants. For this reason the European Commission has imposed a stringent pesticide regulatory scheme for pesticides authorisation, where risk assessment for aquatic organisms and terrestrial macro-organisms is well defined. In contrast the assessment of the toxicity of pesticides on soil microorganisms is lagging behind, still relying on an outdated protocol which fails to identify effects on key microbial functions and on microbial diversity, which can now be accurately determined through advanced and standardized methods introduced in soil microbiology in the last 10 years. EFSA identified soil microorganisms as an attribute to monitor during pesticides environmental risk assessment and stressed the need for novel tests to assess the toxicity of pesticides on soil microorganisms. **The ARISTO project will fulfil this scientific and regulatory gap through a unique**



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doctoral program, based on the strong interaction of academia and industry, aiming to train the next generation of Microbial Ecotoxicologists. These will produce benchmarking knowledge supporting the development of advanced tools and procedures, based on the response of key microbial indicator groups, for the comprehensive assessment of the toxicity of pesticides on soil microorganisms. ARISTO offers doctorate fellows a challenging training program build along 5 research objectives: (1) to develop pioneering *in vitro* tests, as a first conservative step, to assess the toxicity of pesticides on distinct ammonia-oxidizing microorganisms and arbuscular mycorrhizal fungi (2) to develop advanced lab and field tests to assess the toxicity of pesticides on natural soil assemblages of AOM and AMF, as a more realistic toxicity assessment step; (3) to develop an ecosystem-level toxicity assessment looking at pesticide effects at microbial networks and across different trophic levels along the soil food web (predator - prey); (4) to develop novel tools to determine the soil microbial toxicity of pesticide mixtures, and bio-pesticides; (5) to develop and validate advanced *in silico* tools for prioritizing pesticide transformation products with potential toxicity to soil microbes

Job description

The position is available for a period of 36 months (2 periods of 18 months) on these terms. Your key tasks as a PhD student in ARISTO are:

- Participate in the research environment at the host institutions and the network activities of ARISTO
- Manage and carry through your research project
- Take PhD courses
- Write scientific articles and your PhD thesis
- Participate in congresses
- Teach and disseminate your research

Key criteria for the assessment of candidates

- A master's degree related to the subject area of the project
- The grade point average achieved should be more than 75 % of the maximum
- Professional qualifications relevant to the PhD programme
 - Relevant skills: microbial cultivation, molecular biology, soil microbial ecology
- Previous research publications
- Other professional activities
- Language skills: fluency in English

Formal requirements and eligibility

At the time of commencement, it is required that the candidate shall at the date of recruitment, be in the first four years¹ (full time equivalent research experience) of their research careers and have not been awarded a doctoral degree. Furthermore, the candidate **must not** have resided or carried out their main activity (work, studies, etc.) in France and the UK for more than 12 months in the 3 years immediately prior to their recruitment. Short stays, such as holidays, are not taken into account. The candidate is required to spend part of their project period at other institutions in the ARISTO consortium on secondments.

Terms of employment

Recruitment and Terms of appointment will be done according to the rules and regulations of the hosting institutions and according to the rules and regulations laid down by European Union's Horizon 2020 Marie Curie Initial Training Networks. The stipend includes a living allowance (3270 €, adjusted by a country correction factor), mobility allowance (600 €) and family allowance (500 €), the latter allowance depending on the family status of the fellow.

¹ is measured from the date when a researcher obtained the degree which would formally entitle him or her to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the researcher is recruited, irrespective of whether or not a doctorate is or was ever envisaged



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Place of Employment

- Ecole Centrale de Lyon, Laboratoire Ampère, University of Lyon, France, Website: <http://www.genomenviron.org/People/Nicol/Nicol.html> (Month 1 to 18)
- NCIMB Ltd, Aberdeen, Scotland UK, Website: <https://www.ncimb.com/> (Month 19 to Month 36)

Please notice that this PhD fellowship involves a split PhD studentship between an academic and an industrial partner. Hence the selected fellow will have to spend 15 months in the premises of Ecole Centrale de Lyon and 18 months in the premises of NCIMB Ltd, while the fellow will also spend time to other partners through short secondments, see above.

Application Procedure

The application, in English, must be submitted by mail to graeme.nicol@ec-lyon.fr, and C.Phillips@ncimb.com and the coordinator of the project dkarpouzas@uth.gr

Please include

- Motivation Letter, stating which PhD project you are applying, why you want to pursue a PhD career in academic and industrial sectors, and to what extent does the given project complies with your skills and ambition.
- A statement if (and which) you have applied for other ARISTO PhD fellowships
- Full CV including studies, research experience, work experience and publications if any
- Diploma and transcripts of records (BSc and MSc)
- 3 professional referees (Name, address, telephone & email)
- Documentation of English language qualifications

Ecole Centrale de Lyon and NCIMB Ltd wish our staff to reflect the diversity of society and thus welcomes applications from all qualified candidates regardless of age, gender, race, religion or ethnic background.

The deadline for applications is 20.1.2021. Applications received later than this date will not be considered.

Recruitment Process: After the expiry of the deadline for applications, the project manager will provide all applications to the members of the recruitment committee. A recruitment sub-committee for this position composed of the members of the Supervisory Committee (Academic Supervisor, Industrial Supervisor and Secondment Supervisor) will evaluate all applications and select the best three candidates based on the quality of the candidates' previous training, qualifications and skills (as listed above), CV and their motivation for the research topic. The best three candidates will be interviewed by the recruitment committee which will select the best applicant for the position taking into consideration the recommendation of the co-supervisors for the position. The applicants will be notified of the final selection by the Project Manager and will be given 7 days to accept or decline.

Questions

For specific information about the PhD scholarship, please contact the principal supervisors Prof. Graeme Nicol (graeme.nicol@ec-lyon.fr) and Dr. Carol Phillips (c.phillips@ncimb.com).