



ARISTO – PhD Fellowship

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

PhD position in soil microbial ecology (ARISTO)

Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden and SATT SAYENS (SAYENS), Dijon, France

SLU and SAYENS, are offering a PhD position in soil microbial ecology, expected to start May 2021 or as soon as possible thereafter. The PhD will be awarded by the Swedish University of Agricultural Sciences.

Project title: ESR3: Assessment of the ecotoxicity of pesticides on nitrifiers in soil

Project description of the PhD student

To detect potential toxic effects of pesticides on natural microbial soil assemblages, bacteria and archaea involved in nitrification will be used as indicators. Toxic effects can be both direct and indirect, affecting the functioning of soils and their capacity to cope with additional stressors. The aim of the PhD student project is to assess the toxicity of pesticides on the function and diversity of ammonia oxidizing bacteria and archaea, and on other functional groups involved in nitrification in soil. Specific objectives are to identify (i) toxicity endpoints on activity, abundance and diversity of nitrifiers; (ii) toxicity mechanisms on ammonia oxidizing bacteria and archaea; (iii) interaction effects on functional groups involved in nitrification; (iv) stability of functional groups involved in nitrification (i.e. resistance and resilience to secondary stressors). This work goes beyond direct effects of pesticides on ammonia oxidizing bacteria and archaea and brings new knowledge on the use of stability of soil functioning as a bioindicator and establishes novel procedures for assessing pesticide toxicity on soil microorganisms. The PhD student will work with lab and field experiments using a range of molecular techniques (e.g. amplicon sequencing, qPCR) as well as bioinformatic and biostatistical tools.

The PhD position is associated with a large 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 relevant positions within the ARISTO network. Please note that this PhD position involves a split PhD studentship between an academic and an industrial partner. Hence the selected fellow will spend 30 months in the premises of SLU and 18 months in the premises of SAYENS, including time at other partners through short secondments, see above.

Principal supervisor: Prof. Sara Hallin, sara.hallin@slu.se, +46 18 67 32 09 and Dr. Abdelwahad Echairi, abdelwahad.echairi@sayens.fr

Planned secondments: Ecole Centrale de Lyon, France. Supervisor: Prof. G. Nicol (2 months). Purpose: analyses based on Stable Isotope Proping (SIP) to obtain insights on toxicity mechanisms of pesticides on ammonia-oxidizing microorganisms.

Brief description of ARISTO

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



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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 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 48 months (2 periods, 30 months at SLU, 18 months at SAYENS) 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 according to local requirements
- 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 relevant to the subject area of the project
- Documented expertise in soil microbial ecology and skills in bioinformatics, biostatistics, molecular biology is desired
- Previous research publications are merits
- Other professional activities will be considered
- Language skills: fluency in English, both written and oral are required

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 Sweden or France 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, as indicated above.

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 salary includes a living allowance (3270 €, adjusted by a country

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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correction factor), mobility allowance (600 €) and family allowance (500 €), the latter allowance depending on the family status of the fellow.

Place of Employment

- **Swedish University of Agricultural Sciences (SLU)**, Department of Forest ecology and plant pathology, Uppsala, Sweden: <https://www.slu.se/en/departments/forest-mycology-plantpathology/>
- **SATT SAYENS**, Department of Agroenvironment, Dijon, France. <http://www.sayens-agroenvironnement.fr/>

Application Procedure

The application, in English, must be submitted by mail to sara.hallin@slu.se and abdelwahad.echairs@sayens.fr and the coordinator of the project dkarpouzas@uth.gr

Please include

- Motivation Letter, stating which PhD project you are applying for, 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) familiar with your qualifications
- Documentation of English language qualifications

SLU and SAYENS are equal opportunity employers. Applications from all qualified candidates regardless of age, gender, religion or ethnic background are welcome.

The deadline for applications is 20.01.2021. Applications received later than this date will not be considered.

Recruitment Process: After the application deadline, 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 position, please contact the principal supervisors Sara Hallin, sara.hallin@slu.se, +46 18 67 32 09 and Abdelwahad Echairs, abdelwahad.echairs@sayens.fr