

Project “URINIS – Urine nitrification in Space”:

Opportunity for a PhD position

PROFILE SELECTION CRITERIA

Background and experience

- Scientific researcher: A Master degree in biology, environmental engineering, bioscience engineering or equivalent, completed before the start date of the position, with very good and preferably excellent grades.
- Experience in the field of microbiology, microbial ecology and molecular (proteomic/metabolomic ...) analysis will be greatly appreciated.

Scientific knowledge and skills

- Knowledge of bacterial culture and microbiology.
- Ability to rigorously design experiments and to perform experiments under well-controlled conditions.
- Be interested in interdisciplinary research. This includes microbiology and molecular aspects including proteomic and metabolomic.
- Ability to work with analytics, such as IC & GC, as well as experience with microbial analyses.
- Ability to perform in-depth and critical data analysis.
- Ability to communicate through high-quality scientific channels, e.g. WoS publications (A1).

Personal knowledge and skills

- A strong interest in inter/multi-disciplinary applied science.
- Excellent interpersonal skills to work effectively with team members from different backgrounds, from different institutions and with different tasks
- Good oral and written communication skills in English
- Willingness to travel internationally for project meetings and conferences.

JOB DESCRIPTION

URINIS: Urine nitrification in Space

MELISSA is the regenerative life support system for human spaceflight under development by the European Space Agency (ESA) (<https://www.melissafoundation.org>). This ambitious programme aims to produce food, oxygen and water from the mission wastes. Urine is here of key interest, given its high content of nitrogen, which can be recovered to serve as fertilizer for plants and cyanobacteria. Nitrification of urine is the preferred treatment technology, as it produces a stable liquid stream rich in nitrate and low in biodegradable organics.

After two successful experiments demonstrating that nitrifiers can be reactivated after spaceflight to low Earth orbit (Lindeboom et al., 2018; Ilgrande et al., 2019), the Belgian Federal Science Policy Office (BELSPO) and ESA have recently approved the second phase of ‘URINIS’, the MELISSA project to demonstrate the feasibility of urine nitrification in space. The URINIS project, led by Ghent University in collaboration with the University of Mons, the Belgian Nuclear Science Centre (SCK-CEN) and the

University of Antwerp, brings together top scientific teams in the field of applied microbiology and microbial ecology and technology to tackle the challenges of performing such experiments in space and develop the needed tools and methods to analyse its outcomes.

Within this PhD project supervised by Mons University (prof. Ruddy Wattiez & Dr. Baptiste Leroy), the candidate will specifically investigate the impact of storage, microgravity and radiation on the activity of a model heterotroph ureolytic bacteria. The scientist will collaborate and exchange knowledge with two fellow colleagues at the other institutes working respectively on a model ammonium oxidizing bacterium, and a nitrifying bacterium.

Type of employment

- PhD candidate researcher: Full-time, fixed-term appointment for initially 1-year, yearly renewable after positive evaluation up to 4 years (subject to project extension after the first two years). Intended starting date: 1st of February 2020

ABOUT UMONS – PROTMIC

The laboratory of Proteomics and Microbiology is headed by Professor R. Wattiez and belongs to the research institute of Biosciences of the university of Mons (Belgium). ProtMic hosts 3 senior scientists, including B. Leroy and D. Gillan, who is a professor in microbial ecology. The lab also currently welcomes 2 post-docs, 12 PhD students and 3 technicians. Historically, this laboratory has a large expertise in functional proteomic analyses associated to microbial world. Diverse researches are ongoing in the lab mainly concerning environmental microbiology, bacterial stress response and bacterial metabolism. ProtMic is also a full member of the European Space Agency driven MELiSSA project for 15 years ago. In parallel, the academic laboratory is fully associated to the Biotech unit of the research center MateriaNova S.A including 13 researchers.

APPLICATION PROCESS

Applications or information request must be sent via email to ruddy.wattiez@umons.ac.be before 15 January 2019 (23h59 CET), but applications will be regularly reviewed prior to the deadline hence early application is recommended.