



Post-doctoral position in analytical development for rapid antimicrobial susceptibility testing

A post-doctoral position is available in **UMR INSERM 1092**, Limoges, France. The aim of this project is to develop a fast, easy and accurate method able to provide a rapid antimicrobial susceptibility testing (AST) in less than 2 hours starting from bacterial colonies.

Scientific summary:

Conventional microbiology not suited for early targeted antibiotic therapy, as it takes 36-48 hours to determine the antibiotic susceptibility profile of a causative pathogen. The clinician has to make a probabilistic empirical choice between a broad-spectrum antibiotic that is likely to be effective but with the adverse effect of exerting a strong antibiotic selective pressure on the flora, or a narrower antibiotic therapy with the risk to be ineffective on sometimes life-threatening infections. One key element to tackle antibiotic resistance is the development of new, fast and accurate methods able to reduce this delay. **Development of new rapid AST methods is a major public health issue.**

The **DAMOCLES** project relies on the use of the **Sedimentation Field Flow fractionation (SdFFF)** technology. SdFFF, whose implementation for biological applications is unique on Limoges site, has never been used in an application analyzing the behavior of a bacterium in the presence of an antibiotic. SdFFF acts as a phenotypic assay able to detect barely perceptible changes in the behaviour of bacteria and proposes to perform a rapid AST in less than 2 hours.

A proof of concept study performed on *Escherichia coli* reference strains and few antibiotics allowed us to deposit a **patent in 2020**. We need now to demonstrate the test is applicable to all clinically relevant bacteria and clinically relevant antibiotics so that it could be considered as a universal tool.

DAMOCLES is both a research project that can be internationally valued in terms of publications in the fields of bacteriological and analytical sciences and a project that aims to develop a new, effective and rapid diagnostic test for AST determination in bacteriology laboratories. This project relies on a patent and will benefit from the help of several key partners (AVRUL, alpha-RLH cluster) that will help us in developing the project.

A concomitant objective will be to develop a start-up devoted to SdFFF and rapid AST. Incubation of this start-up is scheduled for end-2021. The DAMOCLES project therefore has a very high potential for technology transfer and industrial development in both human and animal health fields.

The candidate:

The ideal candidate should be comfortable with experiments that involve both physical and biological aspects, while working closely with other group members who bring complementary skills. A desire to work on translational research as part of a multidisciplinary team is a prerequisite. He/she may have skills in analytical development systems and biostatistics dedicated to microbiology. Skills in data processing and prototype development would be an added value. The successful candidate must be a highly motivated, enthusiastic and team-oriented scientist.

Required skills:

Microbiology: knowledge in antibiotics and antibiotic resistance mechanisms.

Analytical Chemistry: analytical methods development, data-processing, prototypes, signal treatment, statistics.

Others: Autonomy and initiative; Organizational qualities and integration in a collective; Good level of English and writing skills; interest in entrepreneurship.

The position is funded through an ANR-JCJC grant for **24 months** (start December 1st 2020 or January 1st 2021), with a possibility to look for supplementary funding for a successful candidate.

The research lab:

The UMR INSERM 1092/RESINFIT team led by Prof. Marie-Cécile Ploy is an internationally recognized research team in the field of antimicrobial resistance (<https://www.unilim.fr/recherche/laboratoires/geist/resinfit/>). This team works on a large continuum from very fundamental aspects to translational research programs. The team previously participated in the development of rapid tools for AST both with academics and industrials.

The project will be in collaboration with the group of Serge Battu and Gaëlle Bégaud (Analytical Chemistry laboratory at the Faculty of Pharmacy of Limoges, EA3842/CAPTUR) who have a long-standing experience with SdFFF.

Contact:

Applicants are invited to send a copy of PhD diploma, a CV with a list of publications, a summary of research experience, a motivation letter and recommendation letters of referees to Olivier Barraud olivier.barraud@unilim.fr, Gaëlle Bégaud gaelle.begaud@unilim.fr, Serge Battu serge.battu@unilim.fr and Cindy Demay cindy.demay@inserm.fr.