PhD in Organic and Medicinal Chemistry:

CRASH : Combating **R**esistance to **A**ntibiotic: **S**ynthesis of **H**ybrid Compounds
(**C**ombattre la **R**ésistance aux **A**ntibiotiques : **S**ynthèse de composés **H**ybrides)

Period: 36 months (starting in October 2025)
Level: Master 2

Bacterial resistance to antibiotics is currently a major public health concern. The ability of bacteria to reject antibiotics, combined with the development of biofilms that protect them from external aggression, contributes significantly to overall antibiotic resistance. Our project aims to address this issue by designing molecules capable of enhancing the efficacy of conventional antibiotics. The synthesis of novel bioactive compounds that inhibit both antibiotic efflux in bacteria and biofilm formation represents a major challenge. The new heterocyclic scaffolds synthesized in this research are expected to act additively or synergistically with conventional antibiotics commonly used in the treatment of various bacterial infections.

Microbiological assessments and efflux pump inhibition studies will be carried out in part by a partner laboratory from the Department of Pharmaceutical Sciences at Setsunan University (Japan), and by a team from the University of Rouen Normandie, which will focus in particular on assessing the ability of the compounds to inhibit biofilm formation.
Research will include a phase dedicated to optimizing experimental protocols, with a strong focus on molecular targets. The development of new methodologies will be based on innovative synthetic technologies (radical chemistry, photocatalysis, electrochemistry and flow-through chemistry), in order to meet the contemporary challenges of medicinal chemistry and align with the main scientific priorities of our research unit.

The recruited student should be open-minded and receptive to transdisciplinary approaches. We are seeking highly motivated individuals with a solid background in organic and bio-organic synthesis, as well as strong theoretical knowledge and practical laboratory skills. As part of the CARMeN UMR CNRS 6064 Institute, the student will benefit from access to all facilities required for synthesis and product characterization. Good communication skills and a collaborative spirit are also strongly recommended.

Required skills:

- Organic synthesis, medicinal chemistry approach.
- Analytical chemistry : NMR, MS, HPLC, IR.
- English reading, writing, and speaking.

Funding: Contrat Doctoral d'Etablissement - Université Rouen Normandie
Affiliated doctoral school: Ecole Doctorale Normande de Chimie-ED508

Host Laboratory*:* Institut CARMeN (Ex. COBRA-LCMT), UMR CNRS 6064, Bâtiment IRCOF - 1 Rue Tesnière, 76821 Mont-Saint-Aignan Cedex, France.
website: https://www.lab-cobra.fr/equipes/heterocycles/

Co-Supervisors of the PhD project: Prof. Corinne FRUIT and Prof. Thierry BESSON

Applications should be submitted as soon as possible (deadline 5 May 2025) to corinne.fruit@univ-rouen.fr and thierry.besson@univ-rouen.fr and must include a detailed CV, a cover letter, one or more references (including that of the M2 supervisor), as well as transcripts and class rankings for both M1 and M2.