

PhD Position in Organometallic Chemistry and Radiochemistry

Project Title: Advanced Dual Fluorescent and Radiochemical Platform for Antibody Labelling, Application in Neuro-Oncology (DUORALIUM)

Project Overview: We are seeking a highly motivated and dedicated PhD student to join our research teams. The DUORALIUM project aims to develop an innovative chemical tool that combines both imaging modalities within a single system. The objective is to create a new generation of “dual-labeled” antibodies that can be visualized using both fluorescence (light-based imaging) and radioactive iodine decay (nuclear imaging). By merging these two techniques, clinicians could benefit from complementary information: fluorescence for high-resolution and potentially intraoperative visualization, and nuclear imaging for whole-body, quantitative detection of tumours. At the heart of DUORALIUM is the design of a versatile molecular platform that integrates three essential components into a single structure. The first component is a fluorescent dye derived from cyanine molecules, which emit light in a range suitable for biological imaging. The second component is a carefully engineered organometallic structure that allows the controlled insertion of radioiodine isotopes under mild conditions. The third component is a reactive function that enables attachment to antibodies that specifically recognize and bind to the designated biological target. One of the major challenges in this field is to introduce radioactive iodine efficiently without damaging the antibody or altering its biological function. DUORALIUM addresses this challenge by developing a new organometallic strategy that enables a late-stage, rapid and controlled “halide exchange” reaction. This approach is designed to simplify the labeling process, improve reliability, and enhance safety. The goal is to move as quickly as possible from chemical development to validation in living models, demonstrating that the dual-labeled antibodies can effectively target tumours and produce clear imaging signals. The project benefits from a strong interdisciplinary collaboration bringing together expertise in organometallic chemistry, radiochemistry, molecular imaging, and oncology.

Qualifications:

- Master's degree in organic chemistry or a related field.
- Strong background in synthetic organic chemistry.
- Experience with organometallic chemistry is desirable.
- Experience with bioconjugation technique is desirable.
- Excellent communication and teamwork skills.
- Ability to work independently and efficiently manage research projects.

(An experience in radiochemistry is not mandatory)

Benefits:

- Full-time PhD position starting in October 2026.
- Access to state-of-the-art research facilities and resources.
- Radiation safety training.
- Opportunities for professional development and international collaboration.
- Supportive research environment with mentorship from experienced faculty members.

Application Process: Interested candidates should submit a cover letter, CV, academic transcripts, and contact information for two references to Pr. Thomas Cailly at thomas.cailly@unicaen.fr or Dr. Sylvain Gaillard at sylvain.gaillard@unicaen.fr. Review of applications will begin immediately and continue until the position is filled.