





European Research Council

University of Rennes - Institut des Sciences Chimiques de Rennes UMR 6226 CNRS

Chiral organic luminescent radicals for molecular spintronic

PhD position 2025-2028

This PhD project aims to design original organic π -conjugated systems for innovative (spin-)optoelectronic applications. This 3-year joint PhD position is available between the "Institut des Sciences Chimiques de Rennes" (ISCR – UMR 6226 CNRS) and the University of Swansea (School of engineering and applied sciences), in collaboration between the labs of Dr Ludovic Favereau (Rennes) and Dr Emrys Evans (Swansea).

The design and synthesis of organic molecular materials is currently experiencing significant interest, aiming to bring about innovations in various technological fields of societal importance such as photovoltaics, displays, information transmission and storage. In this regard, the property of chirality has recently emerged as a promising direction in material science due to their specific interaction with circularly polarized light and the potential of the latter in optoelectronic devices (Fuchter *and co., Nat. Rev. Chem.* **2017,** *1* (6), 0045).

We recently contributed to this research area by obtaining the first enantiopure chiral monoradicals displaying SOMO-HOMO inversion (SHI, Figure below, top), affording new perspectives for the synthesis of innovative (chiral) open-shell systems (Favereau *and co.*, <u>J. Am. Chem. Soc. 2020</u> and <u>J. Am. Chem. Soc. 2022</u>). Because of its expertise in studying the magnetic, spin and optical behaviour of organic semiconductors, the group of E. Evans has also recently demonstrated new spin-optical phenomena towards future molecular quantum technology platforms (Figure below, bottom, <u>Gorgon et al, Nature 2023</u>).

> Persitent Helical mono- and diradicals with SOMO-HOMO inversion



Luminescent radical-acene molecular system for reversible spin-optical interface



The PhD will to combine the expertise of both groups to develop innovative chiral organic radicals and investigate their unique properties of luminescence by optical and magnetic resonance spectroscopy. The joint PhD will be awarded from Swansea University and University of













European Research Council

Rennes. It provides an exciting opportunity for interdisciplinary research enabled by collaboration that combines expertise in materials, photophysics, spin and devices. This represents an excellent opportunity for the PhD candidate to acquire scientific and soft skills valuable for academic and professional careers.

The main part of the project will be devoted to the synthesis of chiral organic molecules with different electronic properties and the study of their photophysical, chiroptical and magnetic properties both in solution and solid state.

We are looking for a highly motivated Ph.D. candidate with a strong background in organic synthesis. Experience/interest in photophysical properties will be an added value but is not a requirement. In addition, a strong motivation for research and good communication skills are required (fluent English or French speaking is mandatory).

Salary (net) ~ 1800 €/month, starting date: October 2025 *Please send your records* (CV + marks + recommendation letters) to:

- Dr. Ludovic Favereau, ludovic.favereau@univ-rennes.fr
- Dr. Emrys Evans, Emrys.Evans@Swansea.ac.uk

Deadline: 20 April 2025





