# Research Grants for PhD students from the China Scholarship Council

**Information Form (please read the guidelines carefully on the website www-csc.utt.fr)**

Supervisor's name : PAUL-ROTH  Given names : Christine Odile

Status (prof., assistant prof., …) : Associate Professor

Laboratory : Institut des Sciences Chimiques de Rennes UMR 6226 CNRS INSA de Rennes  Website address : https://iscr.univ-rennes.fr/fr

Institution : INSA de Rennes  Website address : http://www.insa-rennes.fr

Scientific competence of the supervisor:

Organic synthesis, Organometallic synthesis, Porphyrin Dendrimer synthesis, Coordination chemistry, Photophysical studies, medical application, Bioimaging applications

Two major publications in the field proposed for the PhD :

1. L. SHI, Z. SUN, N. RICHY, O. MONGIN, M. BLANCHARD-DESCE, F. PAUL, C. O. PAUL-ROTH, Photochem 2023, 3, 336-359 “Cover Page” (doi.org/103390/photochem3030021)
2. L. SHI, Z. SUN, N. RICHY, O. MONGIN, M. BLANCHARD-DESCE, F. PAUL, C. O. PAUL-ROTH, Chem. Eur. J. 2024, 30 in press (doi.org/10.1002/chem.202303243).

Website address of the personal page : https://iscr.univ-rennes.fr/christine-paul-roth-0

**Supervisor's email :** christine.paul@insa-rennes.fr

***Description of the research work proposed for a PhD***  ***Topic # (see list) :*** IV 2, IV11

Title : Synthesis of Organic Molecular Assemblies based on Porphyrins for Optical applications

Subject :

In this project, new porphyrins assemblies will be synthesized in which tetraarylporphyrin cores are in the center of the architecture. These organic assemblies will be elaborated in a stepwise way starting from the corresponding building blocks. The required porphyrin macrocycles and the neworganic spacers will be obtained by classical organic syntheses. Based on our experience with these derivatives, the targeted assemblies will be elaborated in order to present a maximum fluorescence and also large multi-photonic absorption cross-sections. Applications for such molecules, in the field of molecular imaging or organic light emitting devices will be subsequently targeted depending on their performances.

This work constitutes a strategic opening on innovative international collaborations, since part of the (nonlinear) optical properties will be examined in collaboration with the australian group of Prof. M. G.Humphrey, belonging to the prestigious Australian National University (ANU) in Canberra. The PhD supervisor (C. Paul-Roth) is an expert in porphyrin synthesis. She, and her coworkers experiences in porphyrin dendrimers chemistry, have now acquired a solid experience in designing molecular assemblies with particular optical properties.

Keywords :

Organic synthesis, Porphyrin, Antenna, Luminescence, Photophysical properties.

Expected collaborations :

*Nonlinear optical measurements: Prof. M. Humphrey, Australian National University (ANU) in Canberra-AUSTRALIA

*Linear, Photophysical measurement: Dr M. Blanchard-Desce, CNRS, Institut des sciences moléculaires (ISM, UMR 5255), Université de Bordeaux, France

*Organometallic synthesis: Dr F. Paul, Rennes University-FRANCE.

Background required from the applicant :

The applicant should have knowledge in organic synthesis and in coordination chemistry and be interested in learning molecular photophysics.

Existence of a PDF file detailing the proposal ("yes" or "no") : Yes

*(see guidelines on the website www-csc.utt.fr)*