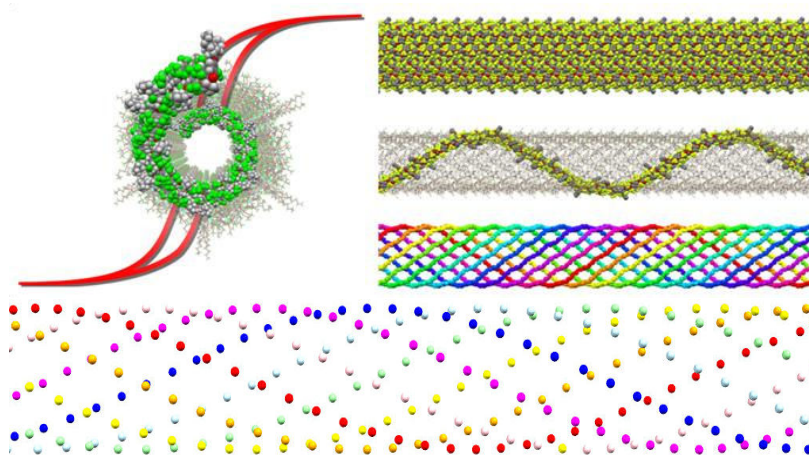


M2 Internship “SUPRAMOLECULAR NANOTUBES OF SINGLE-CHAIN MAGNETS”

Contact: Pr Kevin.Bernot

This project is developed in the framework of the ANR project “NANOCHAINS”. It aims to create advanced molecular magnetic materials made of Single-Chain Magnets (SCMs). SCM are polymeric molecules able to behave as magnets at the molecular scale. However, to transfer their magnetic properties into a device they have to be isolated as surface deposits made of robust molecules. We recently demonstrated that some SCM can spontaneously organize into robust supramolecular nanotubes of woven SCM, forming a new class of magnetic material.^{1,2} We also proved that these objects can be formed either as crystals, gels or solution if properly substituted by alkyl chains.³



During this internship the M2 student will explore the chemistry of these intriguing objects to tune their morphology, processability, optical and magnetic properties and their ability to deposit on surface. In particular he/she will be involved in the chemical synthesis of the supramolecular nanotube as crystals, gels and solutions.

Depending on the success of the first step of the project a short stay (15d) is planned in the University of Florence (Italy) to test electro spray deposition of the nanotubes on various substrates and their imaging via AFM.

Additionally, he/she will work either with basic lab instrumentation (UV-Vis, IR, PXRD, TGA/DTA,...) but will also gain skills on more elaborated characterization techniques such as magnetic measurements (SQUID) and luminescence (Vis and IR).

- Preliminary bibliometric work possible
- Gratification according to French regulations (≈600 €/month for 5 month)
- Starting 26 february 2024, but dates are flexible
- This internship could evolve as a PhD on the same project
- Contact kevin.bernot@insa-rennes.fr before 20/10/2023

[1] [F. Houard *et al.*, *Angew. Chem.-Int. Ed.* **2020**, *59*, 780-784.](#)

[2] [F. Houard *et al.*, Gels de nanotubes supramoléculaires de chaines-aimants, *FR2109779* **2021**](#)

[3] [F. Houard *et al.*, *Mater. Horiz.* **2023**, *10*, 547-555.](#)