

# Thèse: Responsive Materials Based on Supramolecular Branched Polymers

<https://wwwdev.espci.fr/fr/espci-paris-psl/emploi/2013/these-responsive-materials-based-on-supramolecular>

## Laboratoire d'accueil :

Laboratoire Matière Molle et Chimie (UMR 7167)

## Ecole doctorale :

Ecole Doctorale Physique et Chimie des Matériaux, ED 397.

## Sujet de thèse :

Responsive materials based on supramolecular self-assembly of star and hyperbranched polymers

## Thématique de recherche :

Ten Early Stage Researcher (ESR) positions are offered in the FP7 Marie Curie Initial Training Network (ITN) SASSYPOL. This research-training network involves institutions across Europe (10 from the academic sector and 2 from the private sector) which will train a new generation of highly skilled chemists in the production of novel functional soft systems and materials, and push this emerging field of research into applications at the cutting-edge of nanotechnology. The expertise of all partners encompasses supramolecular chemistry and dynamic self-assembly, but individual research competences are quite diverse focusing on molecularly defined nanostructures, liquid crystalline materials, hydrogen-bonded supramolecules, molecular systems based on host-guest interactions, and advanced modelling and characterisation techniques of polymeric and self-assembled materials. Supramolecular chemistry provides a powerful approach to develop new self-assembled materials with properties, such as healability, recyclability and facile processability, which will have applications in biomedicine, energy, composite materials and sensing. The ITN unites leading experts from academic and industry in the areas of supramolecular and polymer chemistry. Partners from the private sector will extend training beyond that of a traditional academic setting, by bridging fundamental science with application and commercialisation. The ITN will thus embrace both breadth and quality that can be achieved only through an interdisciplinary pan-European effort. The training programme aims to improve theoretical, practical and complementary skills of the recruited ESRs : it includes state-of-the-art local training activities, network-wide courses and workshops, and secondments in partner laboratories. ESR Fellowships are available in the following research groups. These positions are open to suitable qualified researchers in the first four years of their research career. Please refer to the Marie Curie website for eligibility details ([http://cordis.europa.eu/fp7/mariecurieactions/glossary\\_en.html](http://cordis.europa.eu/fp7/mariecurieactions/glossary_en.html)). ESR Fellowships are offered in conjunction with a PhD position at the host institution, subject to the ESR Fellow satisfying the admissions requirements of the host institution. Additional funding may be available in countries where PhD training lasts longer than three years. University of Cambridge, UK (Dr O Scherman) : Tunable Hydrogels Driven by Host-Guest Interactions University of Parma, Italy (Prof E Dalcanale) : Supramolecular Polymer Blends through Host-Guest Interactions Eindhoven University of Technology, Netherlands (Prof R Sijbesma) : Biomimetic Hydrogels Eindhoven University of Technology, Netherlands (Prof D Broer) : Structured Hydrogels with Dynamic Response University of Zaragoza, Spain (Prof J L Serrano) : Nanoporous Membranes Based on Supramolecular Organisations University of Manchester, UK (Prof D Leigh) : Extremely Strong and Switchable H-bonded Polymers University of Fribourg, Switzerland (Prof A Killbinger) : Non-Covalent Rod-Coil Networks via Olefin Metathesis Suprapolix, Netherlands (Dr A Bosman) : Self-Healing Supramolecular Materials Jülich Centre for Neutron Science JCNS (JCNS-1) & Institute for



Complex Systems (ICS-1), Germany (Prof W Pyckhout-Hintzen) : Neutron Scattering Investigation of Supramolecular H-bonding Effects ESPCI - Paris Tech, France (Prof L Leibler) : Responsive Materials Based on Supramolecular Branched Polymers Applications should include a CV and contact details for at least two professional referees, and should be sent to Glenda Harden ([mel-sec@ch.cam.ac.uk](mailto:mel-sec@ch.cam.ac.uk)) and to the supervisor leading the project of choice at the specified institution. Please include a cover letter outlining your specific qualifications, indicating your preferred host group and willingness to be considered for other posts in the network.

#### Compétences requises :

Candidates should have a strong background in polymer chemistry. A good knowledge in material characterization will be an asset.

#### Description du sujet :

The PhD study will focus on the synthesis and the characterization of self-assembled films and networks with dynamics and functional properties controlled by mesoscopic organization and directional interactions. The networks prepared will be capable of reorganizing themselves without altering their crosslinking density. These novel materials should be able to go from the liquid to the solid state or vice versa while remaining insoluble. Most importantly, these materials will be reshapeable, repairable and recyclable under the action of heat.

#### Contact

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#### Accès

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