

## MASTER THESIS:

# Transforming magnetic nanocrystals into high-quality candidates for nanomedicine

Motivated students are welcome to join the Functional nanomaterials (FN, IREC-Barcelona) and the Nanocomposites and Nanostructured Materials Lab (LM2N) at the Universitat de Barcelona (UB) groups for a Master thesis. The core activity of both groups is the preparation and characterization of novel functional materials for environmental, energy or nanomedicine applications. Among the current projects at IREC, the candidate will work at the nanocomposites for biomedicine research line. Interested candidates with backgrounds including material science and engineering, chemistry, physics or medical engineering, are welcome to contact the supervisors providing their CV and a brief description of their scientific interests and motivation.

### Project description:

The candidate will develop a novel procedures to transform low-performing pre-synthesized magnetic nanocrystals into high-quality ones. The goal of the project is to recycle well-established synthesis protocols for magnetic nanocrystals that unfortunately do not achieve the requirements for most nanomedicine applications. The FN group has a strong experience in the development of magnetic nanoparticles for biomedical applications and its characterization for magnetic hyperthermia cancer-cell treatment. The candidate will be trained in standard colloidal synthesis procedures, surface modification, and advance structural and magnetic characterization techniques (TEM, SEM, XRD, SQUID, DLS, etc.). She/he will work in an international research group with access to cutting-edge research facilities. The project will be carried out at IREC in collaboration with the UB.

### Activities

- Colloidal synthesis of magnetic nanoparticles and nanoheterostructures
- Structural and magnetic characterization of nanoparticles
- Magnetic and photo hyperthermia characterization
- Report writing and communication skills

### Supervisors

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### Supporting literature and info:

Guardia, P. et al. *ACS Nano*, 2012, 6, 3080-3091

Kolosnjaj-Tabi, J. et al. *ACS Nano*, 2014, 8, 4268-4283

Guardia, P. et al. *J. Mater. Chem. B*, 2014, 2, 4426-4434

<https://iit.it/research/lines/nanomaterials-for-biomedical-applications>