

## **Master thesis: Development of a diagnostic method based on magnetic nanoparticles**

**Master thesis at the Division of Nanotechnology and Functional Materials, Department of Engineering Sciences, Ångström Laboratory. Starting early spring 2020.**

The Division of Nanotechnology and Functional Materials focuses on the development and investigation of nanostructured materials for use in diverse applications ranging from medical devices to energy storage. The multidisciplinary research profile of the group makes it possible to cover a wide range of nanomaterial science aspects from synthesis and characterization of novel materials to biocompatibility and toxicity studies.

### **Project and work description:**

The present project is a part of a bigger project where the aim is to bring forward a low-cost and easy-to-use diagnostic method, which can serve as an efficient analytical platform for rapid detection and characterization of pathogenic bacteria. The detection method combines analysis of changes in rotation dynamics of biofunctionalized magnetic nanoparticles with a detection approach which applies padlock probe ligation technique and rolling circle amplification (RCA) of the probed bacterial DNA. The work includes optimization of the biomolecular protocol and the binding between the magnetic nanoparticles with the DNA molecules. During the project you will take part of performing and modifying the RCA protocol and also characterizing the binding between the DNA molecules and the magnetic nanoparticles. This project will employ characterization techniques such as fluorescence spectroscopy, dynamic light scattering (DLS), ac susceptometry, etc.

**Qualifications:** We are looking for a highly motivated student with previous experience in laboratory work and a background within molecular biotechnology, biology, biochemistry or equivalent.

**Application:** Applications should include a CV and transcript of records showing a list of completed courses and a short motivation letter, and are to be sent to Dr. Teresa Zardán Gómez de la Torre (teresa.zardan@angstrom.uu.se).