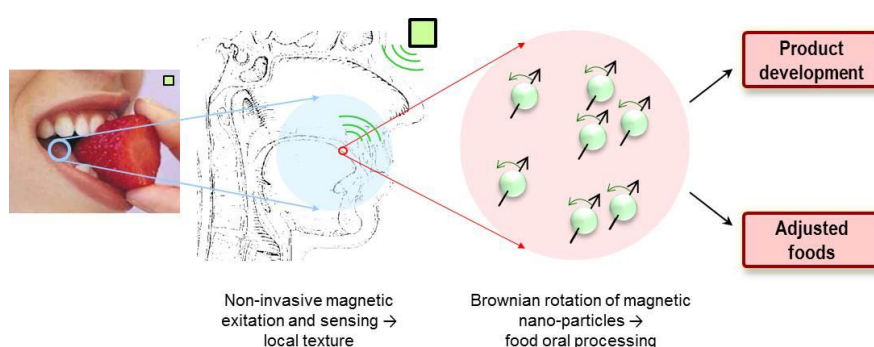


Master thesis Projects

Remote characterization of soft material properties by magnetic nanoparticles

In many applications in pharmaceuticals, foods and medicine it is difficult to characterize soft material properties without interfering with sensitive processes. Magnetic nanoparticles can achieve this and we need your help.

Foods are complex soft materials difficult to characterize, especially when we eat them. Nevertheless, during the few seconds of mastication and swallowing, i.e. the food oral processing, we determine our complete perception of texture, taste and aroma of the product we are eating. The food oral processing determines our judgement – good or bad. This means that if we would know what is going on during these few seconds we could make the tastiest food ever! The problem is though, that as soon as we introduce a probe in the mouth we change the system and the whole perception.



In a new research project we will remotely determine properties of a food during the oral processing using magnetic sensing and magnetic nanoparticles (MNP). A small amount of iron oxide based nanoparticles will sense the surrounding texture through magnetic detection of their particle rotation and the nano-viscoelasticity can therefore be picked up without disturbing the system. By modifying the nanoparticles and e.g. embedding MNPs in proteins further information of aggregation and food texture can be gained.

The design, verification and development of the magnetic system, and the research into food oral processing includes interdisciplinary cooperation between sensor specialists, material and food scientists, and sensory scientists from SP Agrifood and Bioscience, Acreo and Chalmers University of Technology.

We are looking for two MSc students, one based at *Soft Materials Science* at RISE Agrifood and Bioscience and one at RISE Acreo in Göteborg. The first student will focus on MNPs in soft material model systems and foods, and the second student on magnetic properties of the functionalized MNPs, magnetic sensing of the MNP rotation and modelling of the data. Together the two MSc projects will prove this groundbreaking concept.

The supervisors are Mats Stading who leads the group *Soft Materials Science* på RISE Agrifood and Bioscience who also is professor at Materials and Manufacturing Technology at Chalmers and Christer Johansson senior expert at RISE Acreo who is also professor in physics at Microtechnology and Nanoscience at Chalmers. Contact Mats Stading (mats.stading@ri.se, 076 127 2603) or Christer Johansson (christer.johansson@ri.se, 072 723 3321) for more information.