**Topic 3: Composite hydrogels as injectable scaffolds**

Supervisor: [Hanna Tiainen - Institute of Clinical Dentistry (uio.no)](https://www.odont.uio.no/iko/english/people/aca/hannati/index.html) Academic interests: biomaterials, ceramics, materials chemistry, tissue engineering and regeneration, implant surface modification, hydrogels, cell-material interactions, antibacterial properties.

Area of research for the MSCA candidate - Periodontitis and peri-implantitis are bacterially induced chronic inflammatory diseases resulting in progressive destruction of the supportive tissues around teeth and dental implants. These globally prevalent diseases affect millions of people, and the drastic increase in the use of dental implants in the recent years will further add to this problem. New strategies are therefore needed to repair the large number of bone defects that are caused by these diseases. Injectable composite hydrogels are promising scaffold materials to facilitate bone regeneration in such defects as they reliably fill the defect and represent a bone-like environment that can easily be remodelled into new bone tissue.

The postdoctoral fellowship proposal should focus on exploring the formation, structure, and biological performance of composite hydrogels as injectable scaffolds for endogeneous regeneration of mineralised tissues. Our main objective is to develop a hydrogel composition adapted for simultaneous in situ gelation and mineralisation with appropriate reaction kinetics in physiological conditions, with the resulting composite hydrogel combining a bioactive mineral phase with a ECM-like hydrogel matrix that together provide sufficient mechanical stiffness to facilitate a biomimetic environment that favours regeneration of mineralised tissues. We are looking for a potential postdoctoral fellow with:

• interest in developing scaffold materials for tissue regeneration

• interest in materials characterisation using multiple advanced techniques

• previous knowledge of materials characterisation techniques such as rheometry, Raman and/or IR spectroscopy, SEM, TEM, AFM, optical microscopy

• experience with or previous knowledge of hydrogels or calcium phosphates

• experience with programming in Matlab and/or Python will be considered a plus

Any prospective candidate must have completed, or be in the process of completing, a PhD level degree in (bio)materials science, materials or polymer chemistry, biomedical engineering, or other relevant field.