



Departmental Seminars 2025

*Tuesday May 20, 2025 @ 14:30
Room 1_A , Bd Q*

DSV
SEMINARS

Hydrogels under stress: Design and rheological analysis of viscoelastic and injectable hydrogels

Dr. Pascal Bertsch

Department of Chemistry, University of Fribourg, Germany

.....

Hydrogels are widely used in cell or organoid culture, 3D (bio)printing, or as injectable biomaterials. A key benefit of hydrogels is their dynamic and diffusive nature which makes them suitable extracellular matrix mimetics and a versatile biomaterial platform. In this presentation, I will discuss two material design aspects of hydrogels that have recently received considerable attention, namely, their viscoelastic properties as novel cue in cellular mechanotransduction, and their injectability and self-healing properties for use as injectable/printable biomaterials. I will discuss the rheological measurement of viscoelastic stress relaxation or permanent plastic deformation, and how hydrogels can be designed to be responsive specifically in strain/stress ranges relevant for cell activity. Furthermore, I will provide insights into our development of a capillary rheometer for hydrogels that is able to better capture the shear viscosity of hydrogels during injection or printing compared to established rotational rheology.

Relevant Publications:

Bertsch; Andrée; Besheli; Leeuwenburgh. Acta Biomater. 2022, 138, 124–132.

Andrée; Bertsch; Wang; Becker; Leijten; Fischer; Yang; Leeuwenburgh. Biomacromolecules 2023, 24, 2755–2765.

Bertsch; Diba; Mooney; Leeuwenburgh. Chem. Rev. 2023, 123, 834–873.

Bertsch; Schneider; Bovone; Tibbitt; Fischer; Gstöhl. ACS Appl. Mater. Interfaces 2019, 11, 38578–38585.