# Postdoc position

## Brittle to ductile transition in silicate glasses using the phase-field model

**LaMCoS** (Contact and Structure Mechanics Laboratory) is a joint laboratory of the CNRS and the INSA of Lyon. We aim to understand and control the mechanical behavior of structures and moving systems. The researchers at LaMCoS use various experimental and simulation techniques to solve academic and industrial challenges.

### Context

Silicate glasses are exceptional materials that combine mechanical stiffness and optical transparency, durability, and ease of processing. In this project, we propose to build on the paradigm that crack initiation in silicate glasses is mediated by material damage induced through plastic flow and especially inhomogeneous flow. We offer to develop this idea into a quantitative mechanical description of crack initiation and establish relations with glass composition and structure.

### Job description

The position is focused on the development of a phase-field model to simulate shear banding. The candidate will implement a suitable yield criterion with the phase-field method to model shear bands in soda-lime and borate glasses. She/he will develop a phase-field finite element model for indentation experiments and identify the critical length scale where shear bands manifest as a function of strength and fracture toughness. The applicant will work closely with another postdoctoral researcher at LaMCoS, who will identify the necessary material models in atomic-scale simulations.

### Required skills

- Advanced level of understanding in computational fracture mechanics and the finite element method.
- Experience with the phase-field method in fracture.
- Basic knowledge of the concept of shear band formation.
- Adequate experience in computer programming, preferably in FORTRAN, Python, and MATLAB.
- Fluent in English.

Experience in the following areas is a plus:

- Basic knowledge in glass science
- Basic understanding of molecular dynamics/statics
- Experience in ABAQUS.

### Timing

Starting date in the first half of 2022. Duration: 12 months.

### Location

Campus LyonTech-la Doua, Villeurbanne, Lyon (FR). Regular missions to Paris (FR) to interact with the experimental team at ESPCI Paris.

### Contacts

To apply, send your application including a CV with a list of publications and a motivation letter by email with the subject line: "PostDoc GaLAaD phase-field" to:

Gergely Molnár (gergely.molnar@insa-lyon.fr)

This project is funded by the French National Research Agency (ANR) in the framework of the project GaLAaD.