

## HABILITATIONSVORTRAG

Mittwoch, den 12. Juni 2024 – 14:00 Uhr

Sébastien Court

Seminar-  
raum 1  
ICT Gebäude

Forschungsvortrag und Diskussion:

*“Geometric objects coupled with partial differential equations: Optimization, control and simulations“*

We address a family of problems that involves geometric objects immersed into domains where parabolic or hyperbolic partial differential equations (PDEs) are considered. These objects can be deformable or rigid solids, cracks, or interfaces splitting the domain into two parts. When these objects are moving, the unknowns of these PDEs are defined in time-dependent domains. This difficulty raises the question of existence and uniqueness of solutions, especially when the time evolution of the interface is part of the unknowns (free boundary problems). This also raises numerical difficulties, as in an algorithmic framework the computational domain needs to be updated efficiently. This is typically the case when we solve control problems where we optimize the location and/or the shape of these geometric objects. We will explain how we treat these difficulties theoretically and numerically, and will illustrate the findings on examples related to continuum mechanics.