

# The challenge of non-local operators and mixed dimension in simulation and modelling

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## **Abstract**

In this talk, we address some mathematical and numerical challenges of non-linear or non-local partial differential equations in applications. We use a variety of applications ranging from porous-media flow systems, fluid and structural mechanics to biomedical engineering. The special challenges of variational inequalities, mixed-dimensions and non-integer differential operators are illustrated. We show the flexibility of abstract mathematical concepts and discuss limitations in theory and convergence.