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**Conforming and non-conforming approaches for fluid-structure interaction and single-phase flow in fractured porous media**

In this talk, I present a novel fluid-structure interaction formulation based on an unfitted discretization method. I discuss numerical results motivated by biomedicine and geophysics applications for demonstrating the applicability of the proposed methodology to complex fluid-structure interaction scenarios, such as fluid flowing through bioprosthetic heart valves and rough fracture surfaces.

Then, I describe how conforming and non-conforming methods can be employed in the numerical simulation of single-phase flow and transport phenomena in fractured porous media. In particular, I present a comparison between hybrid and equidimensional numerical models.

Finally, I discuss the impact that coupling growth theory, fluid-structure interaction analysis, and experimental data would have on biomedical applications.