



Contribution ID: 28

Type: Oral Presentation

Multilayered poroelasticity interacting with Stokes flow

Tuesday, 1 June 2021 16:25 (15 minutes)

We prove the existence of a weak solution to a fluid-poroelastic structure interaction problem in which the structure consists of two layers: a thin poroelastic plate layer in direct contact with Stokes flow, and a thick Biot layer sitting on top of the thin layer. In the (quasi-static) Biot layer the permeability is a nonlinear function of the fluid content. Existence of a weak solution is obtained using a constructive proof based on Rothe's method. We provide uniqueness criteria and show that the constructed weak solutions are indeed strong solutions if one assumes additional regularity. We show how this result impacts the design of drug-eluting stents for the treatment of coronary artery disease.

The presence of drug-eluting stents alters the permeability of the arterial walls and impacts advection, reaction and diffusion of anti-inflammatory drugs, such as sirolimus, into the poroelastic arterial walls. This information helps alter the design of drug-eluting stents for improved long-term efficacy. The results presented in this talk were obtained in part with Lorena Bociu, Boris Muha, Yifan Wang, and Justin Webster.

Time Block Preference

Time Block C (18:00-21:00 CET)

References

Acceptance of Terms and Conditions

[Click here to agree](#)

Newsletter

I do not want to receive the InterPore newsletter

Primary author: Prof. CANIC, Suncica (University of California Berkeley)

Presenter: Prof. CANIC, Suncica (University of California Berkeley)

Session Classification: MS24

Track Classification: (MS24 - Invitation Only) Mathematical and computational challenges related to porous media - Special session in memory of Andro Mikelic