

Abstract Submitted
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Quasi-steady buckling configurations of a wet elastic septum

CHRIS BOAMAH MENSAH, GREG CHINI, University of New Hampshire, OLIVER JENSEN, University of Manchester — Motivated by an application to pulmonary alveolar micro-mechanics, the quasi-steady structure of a thin elastic septum lined on each side with a Newtonian fluid film is investigated. The substrate is modeled as an inertia-less kinematically nonlinear Euler–Bernoulli beam with small bending stiffness, while the thin-film distributions are determined using lubrication theory. Guided by finite-difference numerical simulations that yield the long-time behavior of the system, semi-analytical steady-state solutions are obtained. The solution structure is explored as a function of the axial and bending stiffnesses, fluid film volumes, and pre-compression of the substrate.

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