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On the the Contact Lens Problem: Modeling Rigid and Elastic Beams on Thin Films PHILIPPE TRINH, Princeton University, STEPHEN WILSON, Strathclyde University, HOWARD STONE, Princeton University — Generally, contact lenses are prescribed by the practitioner to fit each individual patient's eye, but these fitting-philosophies are based on empirical studies and a certain degree of trial-and-error. A badly fitted lens can cause a range of afflictions, which varies from mild dry-eye-discomfort, to more serious corneal diseases. Thus, at this heart of this problem, is the question of *how a rigid or elastic plate interacts with the free-surface of a thin viscous film.* In this talk, we present several mathematical models for the study of these plate-and-fluid problems. Asymptotic and numerical results are described, and we explain the role of elasticity, surface tension, viscosity, and pressure in determining the equilibrium solutions. Finally, we discuss the implications of our work on the contact lens problem, as well as on other coating processes which involve elastic substrates.

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