



# FRONTIERS IN MICRORHEOLOGY



## The Micromechanics of Collagen-I Gels

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**Abstract:** In recent years, semiflexible polymer networks, such as actin, fibrin, and collagen networks have been studied both experimentally and theoretically. However, it still remains difficult to quantitatively link theory to experiment. In this work, we use a novel image processing algorithm to extract the 3d geometry of a network from a 3d stack of images of fluorescently labeled collagen. We then model each fiber as an Euler-Bernoulli beam, having a stretching and bending modulus, and each cross-link as a torsional spring. With one free parameter (the cross-link torsional spring constant), we can fit many features of the experimental data, including the small strain modulus, the large strain modulus and the onset of strain stiffening, for gels at three different densities.



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