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**Cavitation Rheology of Polyacrylamide Hydrogels** SANTANU KUNDU, JESSICA ZIMBERLIN, ALFRED CROSBY<sup>1</sup>,  
University of Massachusetts-Amherst — Cavitation rheology is a new characterization technique for the measurement of mechanical properties on small length scales, e.g. 10 -100  $\mu\text{m}$ , at any arbitrary location within a soft material. The technique involves growing a cavity at the tip of a syringe needle and monitoring the pressure of the cavity at the onset of instability. This critical pressure is directly related to the local modulus of the material. We used this technique to characterize the network mechanics of polyacrylamide hydrogel materials, a common material used in many biological applications. We compared the cavitation rheology results with that obtained from shear rheometry. This technique was used to investigate the rheological properties of gels with different dimensions and different moduli, which were obtained by varying initial monomer to water ratio. These results provide a quantitative foundation for the extension of this technique to *in vivo* characterization of biological tissues.

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