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Direct micro-mechanical measurements on *C. elegans* MATILDA BACKHOLM, Department of Physics & Astronomy and the Brockhouse Institute for Materials Research, McMaster University, Hamilton, Canada, WILLIAM S. RYU, Department of Physics, University of Toronto, Toronto, Canada, KARI DALNOKI-VERESS, Department of Physics & Astronomy and the Brockhouse Institute for Materials Research, McMaster University, Hamilton, Canada — The millimeter-sized nematode *Caenorhabditis elegans* provides an excellent biophysical system for both static and dynamic biomechanical studies. The undulatory motion exhibited by this model organism as it crawls or swims through a medium is ubiquitous in nature at scales from microns to meters. A successful description of this form of locomotion requires knowledge of the material properties of the crawler, as well as its force output as it moves. Here we present an experimental technique with which the material properties and dynamics of *C. elegans* can be directly probed. By using the deflection of a flexible micropipette, the bending stiffness of *C. elegans* has been measured at all stages of its life cycle, as well as along the body of the adult worm. The mechanical properties of the worm are modelled as a viscoelastic material which provides new insights into its material properties. The forces exerted by the worm during undulatory motion are also discussed. Direct experimental characterization of this model organism provides guidance for theoretical treatments of undulatory locomotion in general.

Matilda Backholm
Department of Physics & Astronomy, McMaster University, Canada

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