Electromechanical Energy Conversion using a Bent-Core Nematic Liquid Crystalline Elastomer and the Giant Flexoelectric Effect JOHN HARDEN, Kent State University, RAFAEL VERDUZCO, Rice University, PAUL LUCHETTE, JAMES GLEESON, SAMUEL SPRUNT, ANTAL JAKLI, Kent State University — The flexoelectric effect is an electro-mechanical phenomenon that arises in liquid crystals where an electric polarization develops in response to a bend or splay of the liquid crystal director. Recently, it has been shown that nematic bent core LCs exhibit a flexoelectric coefficient more than three orders of magnitude larger than in previously studied calamitic nematic LCs, paving the way for electromechanical devices that utilize the flexoelectric effect. In order to develop practical, viable flexoelectric materials, it is necessary to incorporate the bent core nematic LC between flexible substrates or in a polymer matrix. Here we present and introduce the first nematic bent core liquid crystal elastomer. Monofunctional bent-core LCs with a reactive alkene group are used to make aligned side chain nematic elastomers using the method of Finkelmann. The flexoelectric coefficient $e_3$ was found by direct flexing to be $30\text{nC/m}$. This is comparable to similar fluid bent core nematic liquid crystals. The work is supported by the ONR under grant N00014-07-1-0440) and NSF under DMR-0606160. The Elastomer provided the New Liquid Crystal Materials Facility, http://nlcmf.lci.kent.edu, supported by the NSF DMR 0606357.