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**Abstract TITLE:** Untethered thermo-magnetically responsive hydrogel microgrippers **AUTHORS (FIRST NAME, LAST NAME):** ChangKyu Yoon<sup>4</sup> , Frank van den Brink<sup>1</sup> , Rui Xiao<sup>5</sup> , Thao D Nguyen<sup>5</sup> , Sarthak Misra<sup>1, 3</sup>, David H. Gracias<sup>2, 4</sup>

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**ABSTRACT BODY:** The fabrication, characterization and operation of untethered, environmentally responsive microgrippers will be discussed. In these soft-robotic microdevices, a stimuli responsive hydrogel such as poly(Nisopropylacrylamide) is paired with a rigid non-swelling polymer to create reversible self-folding devices. Environmentally responsive swelling and de-swelling of the hydrogel is used to power opening and closing of multifingered microgrippers. Using simulations and experiments, the self-folding characteristics of the devices are investigated. Further, by incorporating magnetic nanoparticles, the devices can be precisely manipulated from afar using magnetic fields to perform tasks such as pick-and-place and micro-assembly. We anticipate widespread use of these devices in minimally invasive surgery, drug delivery and soft-robotics.

# Untethered Thermo-Magnetically Responsive Hydrogel Microgrippers

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