

# Natalie Pinchin

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## **Liquid Crystal Elastomers with Magnetic Nanoparticles and Self-Healing for Complex Actuation and Locomotion**

The introduction of magnetic microparticles to liquid crystal elastomers (LCEs) is reported to enable magnetic programming and actuation of LCEs, allowing for shape change programmability through both molecular alignment of LCEs and magnetization of particles. We propose to integrate ferromagnetic nanoparticles into LCEs to minimize the detrimental effect of particle loading on LC alignment. LCEs with self-healing capabilities via dynamic covalent bonds will be used as the matrix, allowing for the fabrication of LCEs with complex actuation profiles.