

Abstract Submitted
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Optimization of a Universal Granular Gripper Using Geometrical Inserts EDWARD DAVIS, BRIAN UTTER, KAIXIANG SHI, Bucknell University, RYDER WINANS, Rensselaer Polytechnic Institute, CHARLES KIM, Bucknell University — Universal robotic grippers utilize granular jamming in order to pick up objects of various sizes and fragility. Grains within an elastic membrane easily mold to an object's shape, and when evacuated, the granular material undergoes a jamming transition such that the gripper becomes rigid and grasps the object. We optimize the maneuverability and holding force of the device for the application of positioning retractors during thyroidectomies. We aim to improve on prior universal grippers by attaching retractors directly to an insert within the membrane to increase coupling with the granular medium. We present data for a range of insert geometries with the goal of achieving maximum holding force under vacuum and with maximal maneuverability without vacuum.

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