**Docket #:** S17-318

# Patterned and instrumented directional adhesives for enhanced gripping with industrial manipulators

Researchers in Dr. Cutkosky's laboratory have developed a gripper device that allows industrial robots to handle very soft or delicate objects. Effective handling of delicate objects remains a challenging problem in manufacturing. To address these challenges, Stanford researchers use gecko-inspired directional adhesives attached to an industrial robot gripper with a tactile sensor. With these enhancements, the robot uses a very low grasp force to sustain loads in any direction, avoids load dropping and slipping, and the load remains residue-free when the grip is released. This technology is applicable to robotic tasks with delicate or soft objects.

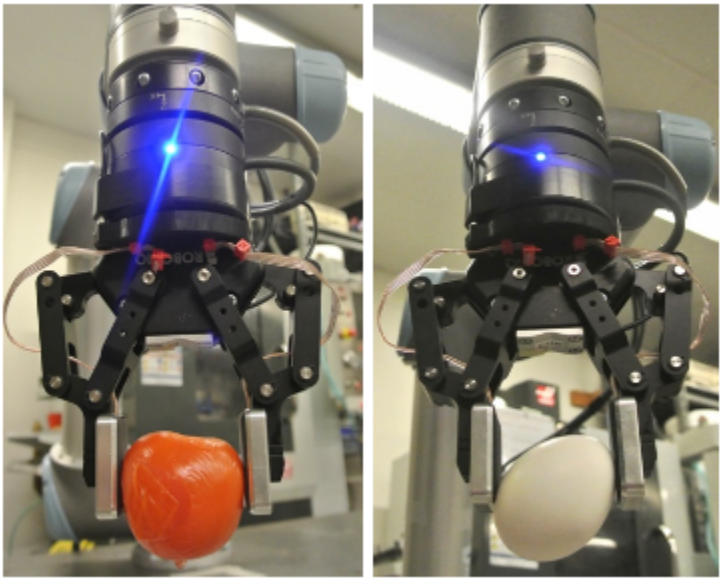


Fig. 1: An industrial robot using gecko-inspired adhesives on the gripper pads can grip and manipulate a rotten tomato and a raw egg gently and reliably.

## Applications

- Industrial robotics
- Medical and surgical robotics

## Advantages

- Improved handling for robotic manufacturing tasks with delicate or soft objects.
- A much lower grip force needed than would be possible using conventional materials such as rubber pads.
- Reliably predicts the maximum force and moment that can be applied without slipping.

## Publications

- Roberge, Jean-Phillippe, Ruotolo, Wilson, Duchaine, Vincent and Cutkosky, Mark. (April 2018). Improving Industrial Grippers With Adhesion-Controlled Friction. *IEEE Robotics and Automation Letters*, Volume: 3, Issue: 2.

## Patents

- Published Application: 20190143532
- Issued: 10,875,190 (USA)

## Innovators

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