

(SD2021-087) Bioinspired Wet Adhesives: Suction discs for adhesion to rough, delicate, and wet surfaces

Tech ID: 32483 / UC Case 2021-Z08-1

BACKGROUND

Adhesion involves highly complex and hierarchical structures in nature, and by understanding the biological intricacies of such adhesive structures, one can improve engineered adhesives. The role of reversible adhesion in both the natural world and in engineering is to temporarily bind to a surface, providing the opportunity to detach and re-attach as needed. In nature, animals use attachment to enhance their fitness. In robotics, reversible adhesion enables improved manipulation and locomotion by managing contact at the interface between the robot and its environment.

TECHNOLOGY DESCRIPTION

UC Researchers patented a novel suction disc that can reversibly attach to rough and delicate surfaces in either wet or dry environments and is resistant to dislodgement forces that can act both perpendicular and parallel to the surface to which it is attached.

The innovation aspects lies in the ability of the disc to maintain sealed this chamber of low pressure on rough, wet, or delicate surfaces and while subjected to forces of dislodgement from random directions.

APPLICATIONS

This invention has numerous commercial applications in the robotic and medical sectors. Soft gripping is integral in a variety of fields, from marine archaeology to the manufacturing/agricultural industries. Soft manipulation may be applied to the fruit harvesting and packaging industries. The inventors have demonstrated the ability to reliably pick up even the most delicate of produce, such as strawberries or cherries, without damage.

In the medical field, the inventors have been working to apply these suction discs and surface structures to minimally invasive surgeries, in which delicate tissue manipulation is required. It is the general opinion of human health experts that further research into such fields as cardiology and internal medicine will yield new

CONTACT

University of California, San Diego
Office of Innovation and Commercialization
innovation@ucsd.edu
tel: 858.534.5815.



OTHER INFORMATION

KEYWORDS

bioinspired design, surface interactions, Mathematical methods, underwater adhesion, Gobiesox maeandricus, surface structuring, image processing

CATEGORIZED AS

- **Engineering**
 - Engineering
 - Robotics and Automation
- **Imaging**
 - Other
- **Medical**
 - Devices

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uses of the technology. This technology reduces tissue interaction which leads to less trauma for the patient.

Other applications of this technology may include wall mounts both in air and in water, where a suction cup currently fails to adhere.

ADVANTAGES

The primary difference of this new disc technology to the suction cup is the disc technology can adhere to a much wider range of substrates under a much greater diversity of environments.

STATE OF DEVELOPMENT

INTELLECTUAL PROPERTY INFO

This patented technology is available for commercial development. US patent rights are available for commercial licensing.

US issued patent: <https://patents.google.com/patent/US11674545B2/en?q=17%2c489%2c578>

RELATED MATERIALS

► Jessica Sandoval, Jade Sommers, Karthik Reddy Peddireddy, Rae M Robertson-Anderson, Michael T. Tolley, and Dimitri D. Deheyn. Toward Bioinspired Wet Adhesives: Lessons from Assessing Surface Structures of the Suction Disc of Intertidal Clingfish. ACS Applied Materials & Interfaces 2020 12 (40), 45460-45475 - 09/10/2020

University of California, San Diego
Office of Innovation and Commercialization
9500 Gilman Drive, MC 0910, ,
La Jolla,CA 92093-0910

Tel: 858.534.5815
innovation@ucsd.edu
<https://innovation.ucsd.edu>
Fax: 858.534.7345

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