

Title: Icy-Moon Cryo-Environment Penetrating Ice Claw (ICE-PIC)

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Team: Senior Graduate Student
2 Undergraduate Honors Students



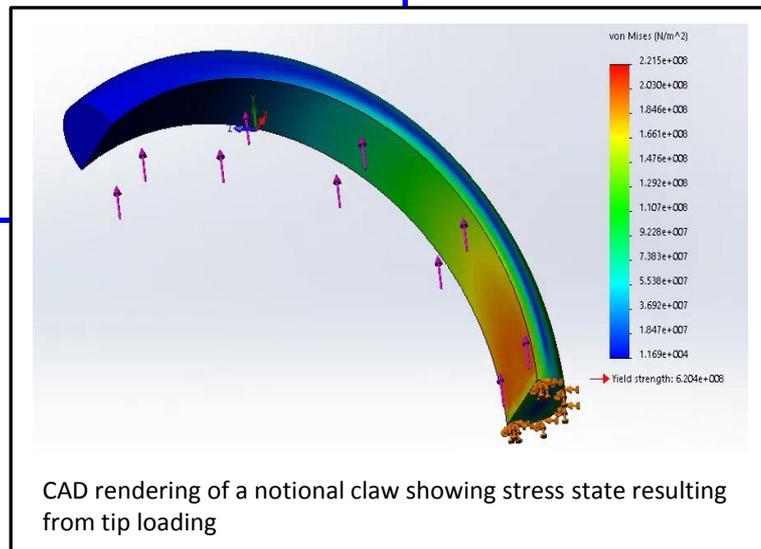
Research Objectives

- Prototype a novel sublimating “claw” mechanism for gripping into ice
- Characterize performance and power requirements
- Integrate into an actuated end effector
- Demonstrate a fully operational climber

- Raise the technology from TRL 2 to TRL 4

Approach

- Prototype thermal tip and test extensively in dry ice
 - Force/Thermal loading
 - Adhesion properties
 - Materials/coatings
- Evaluate same performance parameters in water ice at cryogenic temperatures in a vacuum environment
- Integrate the thermal tips into an actuated claw
- Perform integrated testing on a mobile platform



Potential Impact

- Enable navigation of extreme terrain
- Improve the versatility of a legged rover
- Enable the the climbing of sheer or possibly even inverted surfaces
- Reduce the need to optimize foot placement, allowing for greater autonomy