

# LOCOMOTION DEVICE AND METHODS AND RELATED SOFTWARE

Tech ID: 27105 / UC Case 2017-042-0

## PATENT STATUS

| Country                  | Type          | Number     | Dated      | Case     |
|--------------------------|---------------|------------|------------|----------|
| United States Of America | Issued Patent | 11,938,044 | 03/26/2024 | 2017-042 |

## BRIEF DESCRIPTION

Next-generation robotic technology is driving towards better control of agile motions. This includes a technology focus on generating enhanced peak power for jumping agility. Most leaping robots use a spring mechanism with a latch. Due to the on/off nature of latches, the result is very high-powered releases of energy which are difficult to control. To address this problem, researchers at the University of California, Berkeley, have developed a new mechanical approach using “power modulation” that allows for high amplitude, high frequency jumps without the use of latches. In one embodiment, a multi-bar linkage connected only by revolute joints is capable of minimizing impulse loading and manipulating power output while performing rotation-free jumps. The Berkeley team has demonstrated an 85 gram prototype which delivered almost four times more peak jumping power than the maximum its motor can produce. Moreover, *in silico* testing predicts the prototype could reach an agility levels exceeding that of the most agile animals if the actuator power is raised to 15W.

## SUGGESTED USES

- » Military robotics
- » Civilian robotics
- » Industrial robotics

## FEATURES/BENEFITS

- » Uses many off-the-shelf-parts
- » Precision control with latchless/catchless scheme
- » Output power exceeds the maximum of the motor element
- » Constant output force during sprung linkage release to minimize impulse loading
- » Compact, lightweight design
- » Minimally actuated

## RELATED MATERIALS

- » [2016 IEEE/RSJ International Conference on Intelligent Robots and Systems - 10/09/2016](#)

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Printable Repulsive-Force Electrostatic Actuator Methods and Device](#)
- ▶ [Multilayer Pouch Robot And Manufacturing Method](#)
- ▶ [Compact Series Elastic Actuator Integration](#)

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## INVENTORS

- » Fearing, Ronald S.

## OTHER INFORMATION

### KEYWORDS

power modulation, robot, rotation-free,  
series elastic, monopod, jumping,  
leaping, jump, leap, jumping robot,  
leaping robot, agile robotic, MIT  
Cheetah, actuator, actuation

### CATEGORIZED AS

- » [Engineering](#)
- » [Robotics and Automation](#)

### RELATED CASES

2017-042-0



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