

**Docket #:** S22-023

# **An All-Soft Variable Impedance Actuator Enabled by Embedded Layer Jamming**

The Follmer group has designed a soft jamming brake and artificial muscle (SJBAM) actuator for improved muscle static and dynamic response along with expanded brake bandwidth. The design incorporates a jamming brake insure a pneumatic artificial muscle (PAM) for synergistic benefits, which allows it to store elastic energy like a PAM and act as a brake or clutch. The result is an all-soft variable impedance actuator enabling simpler controls and braking/clutching abilities. This system provides superior artificial muscle performance for applications in industrial robots and machinery, exoskeletons, haptic interfaces, and automobiles.

## **Stage of Research**

Prototype

## **Applications**

- Industrial robots and machinery
- Exoskeletons
- Haptic interfaces
- Automobiles

## **Advantages**

- Enhanced brake bandwidth
- Increased muscle force production
- Faster dynamic response

## Publications

- B. H. Do, I. Choi and S. Follmer, "[An All-Soft Variable Impedance Actuator Enabled by Embedded Layer Jamming](#)," in *IEEE/ASME Transactions on Mechatronics*, 2022, doi: 10.1109/TMECH.2022.3183576.

## Patents

- Published Application: [20230258204](#)
- Published Application: [20240035494](#)
- Issued: [12577968 \(USA\)](#)

## Innovators

- Brian Do
- Inrak Choi
- Sean Follmer

## Licensing Contact

### Michael Spaid

Technology Licensing Associate 2

[Email](#)