

Dear Editor(s),

Please find enclosed our manuscript entitled “Isometric Force Characterization of Braided Pneumatic Actuators” which we are submitting for consideration for publication in *Sensors and Actuators: A. Physical*.

Artificial muscles such as braided pneumatic actuators (BPAs) offer many advantages for robotic systems, including high durability and strength-to-weight ratios. However, their use in robotic systems is still extremely limited, in part due to their poor force, length, and pressure characterization. In this work, a test setup is created to compare force produced by Festo fluidic BPAs with leading models. A setup was developed to test static BPA muscle force while varying pressure and contraction. Our analysis of the data has resulted in:

- (1) The development of new equations to calculate force as functions of pressure and contraction for Festo BPAs with uninflated diameters of 10 mm and 20 mm
- (2) A novel equation for the maximum force in 10 mm and 20 mm diameter Festo BPAs as a function of their resting length.

This will lead to faster design processes and the development of biomimetic robots that are able to more accurately reproduce the range of motion and isometric torque profiles that exist in the animals they are mimicking.

Warmest Regards,
Ben Bolen
Mohamad Elzein
Larence Pang
Dr. Alexander J. Hunt (P.I.)