**Title:** Adding carbon fiber to shoe soles may not improve running economy:

a muscle-level explanation

**Authors:** Owen N. Beck,1,2\* Pawel R. Golyski,1,3 & Gregory S. Sawicki1,2,3

1George W. Woodruff School of Mechanical Engineering, 2School of Biological Sciences,

and 3Parker H. Petit Institute for Bioengineering and Biosciences,

Georgia Institute of Technology, Atlanta, GA

**\*Corresponding Author**

Name: Owen N. Beck

Address: Georgia Institute of Technology

School of Mechanical Engineering

455 Callaway Manufacturing Research Center Building

813 Ferst Dr NW

Atlanta, GA 30332

E-mail: obeck3@gatech.edu

**Supplementary Table 1.** Number of participants that yielded the lowest and highest value for select biomechanical variables.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Footwear Bending Stiffness (kN/m) | Ground ContactTime | Hip Moment | Knee Moment | Ankle Moment | Soleus Force | Soleus Fascicle Length\* | Soleus Fascicle Velocity\* |
| Low | High | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| 13.0 ± 1.0 | 6 | 1 | 7 | 1 | 6 | 3 | 1 | 8 | 4 | 7 | 1 | 3 | 4 | 2 |
| 31.0 ± 1.5 | 3 | 4 | 1 | 4 | 3 | 4 | 6 | 2 | 4 | 2 | 2 | 3 | 1 | 4 |
| 43.1 ± 1.6 | 3 | 3 | 4 | 4 | 1 | 3 | 4 | 1 | 4 | 3 | 5 | 1 | 2 | 4 |
| 84.1 ± 1.1 | 3 | 7 | 3 | 6 | 5 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 1 |

\*n=11 participants due to technical difficulties.



**Supplementary Figure 1.** Gross aerobic power versus footwear bending stiffness for each participant.