## **Description of Additional Supplementary Files**

File Name: Supplementary Movie 1

Description: Shape, mean curvature, surface accessibility, and normal and shear traction

force magnitude for particle 1 (9 % engulfed).

File Name: Supplementary Movie 2

Description: Shape, mean curvature, surface accessibility, and normal and shear traction

force magnitude for particle 2 (34 % engulfed).

File Name: Supplementary Movie 3

Description: Shape, mean curvature, surface accessibility, and normal and shear traction

force magnitude for particle 3 (84 % engulfed).

File Name: Supplementary Movie 4

Description: Shape, mean curvature, surface accessibility, and normal and shear traction

force magnitude for particle 4 (100 % engulfed).