Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Walking the Tightrope: Colloidal surfers mimicking molecular motors VIVA R. HOROWITZ, Hamilton College, MICHELLE DRISCOLL, MELISSA FERRARI, MENA YOUSSEF, STEFANO SACANNA, PAUL CHAIKIN, New York University, VINOTHAN N. MANOHARAN, Harvard University — We aim to understand cellular processes, particularly intracellular transport, at a physical level by building simple, wellcontrolled systems that mimic the functions of a cell. We are inspired by molecular motors such as kinesin and myosin, which create a dynamic environment that is likely necessary for the biochemical reactions that take place in a eukaryotic cell. One approach we have taken is to investigate the superdiffusive environment created by platinum Janus swimmers encapsulated in artificial cells. Now we are investigating the motion of light-activated colloidal surfers. When they are activated, these particles are attracted to each other and to surfaces, and they are self-propelled, moving via self-diffusiophoresis. On a flat surface, these properties cause the particles to form active crystal structures [1]. When we introduce a wire to the geometry, the particles walk along a wire, reminiscent of the motion of molecular motors such as kinesin walking on a microtubule. When the wire is suspended in the center of a fluid chamber, the particles walk the tightrope. This bio-inspired research may lead to systems of particles walking networks of wires and carrying cargo through an artificial cell. [1] Palacci, J., et al. Science 339, 936940 (2013).

Viva R. Horowitz
Hamilton College

Date submitted: 11 Nov 2016 Electronic form version 1.4