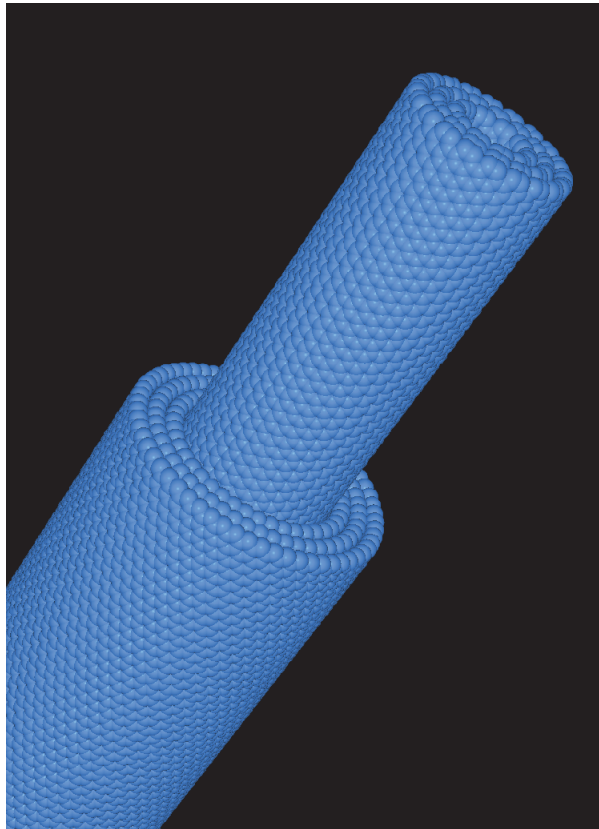
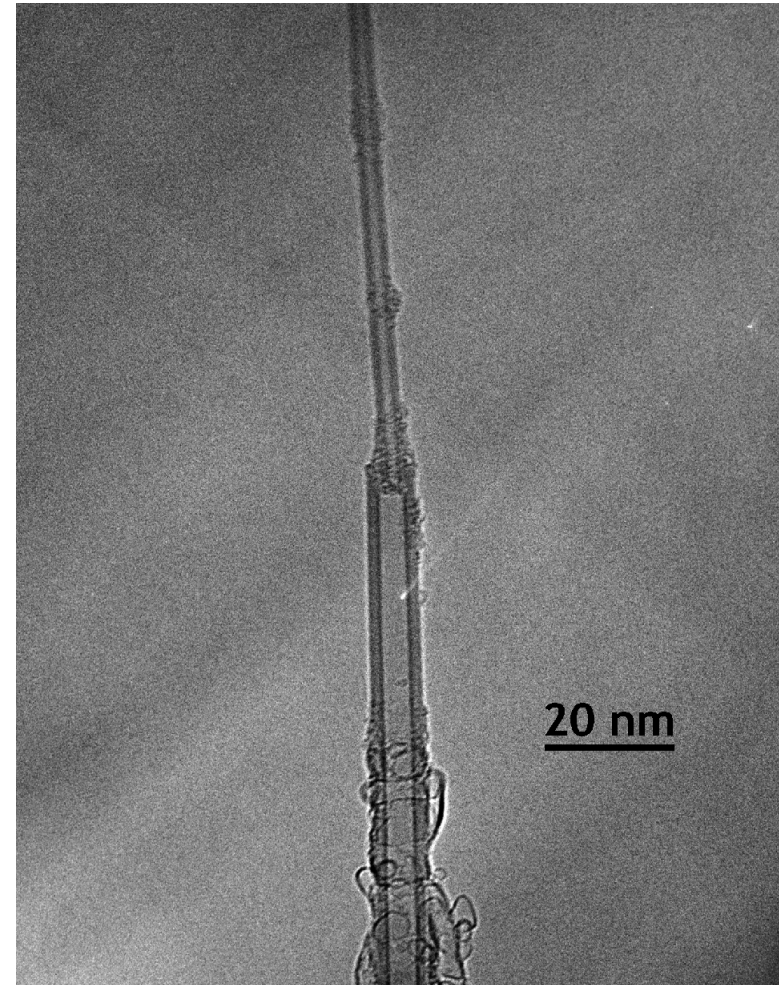


# Telescoping Nanotubes Demonstrated as Nanoscale, Linear, Low Wear “Bearings” and “Springs”



Model of a multiwall carbon nanotube whose inner set of tubes has been “telescoped” out. This sliding motion is theoretically predicted and experimentally demonstrated to be almost frictionless. The tubes thus could constitute an ideal nanoscale bearing or constant force spring.



Transmission electron microscope image taken at the LBNL National Center for Electron Microscopy of a “telescoped” multiwall carbon nanotube. No atomic-scale degradation is observed with repeated extensions and retractions. The system may thus be wear-free with no fatigue.