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Directed Self-assembly of Nanostructures to Develop AFM-Based Biomaterial-to-Electronic Interface MEHDI YAZDANPANAH, MAHDI HOSSEINI, SANTOSH PABBA, SCOTT BERRY, VLADIMIR DOBROKHOTOV, ABDELILAH SAFIR, ROBERT KEYNTON, ROBERT COHN, University of Louisville, ELECTROOPTICS RESEARCH INSTITUTE AND NANOTECHNOLOGY CENTER TEAM — Very flexible and rugged Ag_2Ga nanoneedles of constant diameter (sub 100 nm diameter, 7-70 microns long) can be securely grown onto AFM tips at room temperature. These nanoneedles are electrically conductive and have stiffness well matched to viscoelastic properties of complex fluids and biological materials. This talk specifically presents the abilities of the needles to (1) make precise AFM measurements of surface tension, contact angle, evaporation rate, and shear viscosity of polymeric liquids, (2) measure complex viscoelastic properties of cell membranes and organelles of blood and endothelial cells, (3) capture and be surrounded by single live endothelial cells within a few seconds, (4) polymerize and detect the growth of protein nanofibers on the end of the nanoneedles and (5) Functionalize the end of the needles with protein nanofibers and use them for imaging the cell receptors.

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