

MAR17-2016-009498

Abstract for an Invited Paper
for the MAR17 Meeting of
the American Physical Society

Adding Interdisciplinary Exploration to Teaching Laboratories using AFM and Biophysical Samples.¹

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Biophysics and nanotechnology are promising areas for the next generation of physicists to make an impact. To prepare students for these opportunities, we can add interdisciplinary exploration to our teaching laboratories. Here we describe several biophysical experiments that could be done in the undergraduate teaching laboratory using an AFM. In each laboratory, we image a biological sample and quantify a biophysical parameter: 1) imaging cells to determine membrane tension, 2) imaging microtubules to determine their persistence length, 3) imaging the random walk of DNA molecules to determine their contour length, and 4) imaging stretched DNA molecules to measure the tensional force. In addition, each experiment acts as a gateway for further interdisciplinary exploration in the teaching laboratory or beyond.

¹Work was supported by funds from the Research Corporation.