

Abstract Submitted
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Detecting Lyme disease using antibody-functionalized carbon nanotubes JENNIFER DAILEY, University of Pennsylvania, Department of Physics and Astronomy, MITCHELL LERNER, BRETT GOLDSMITH, University of Pennsylvania, Department of Physics and Astronomy, DUSTIN BRISSON, University of Pennsylvania, Department of Biology, A.T. CHARLIE JOHNSON, University of Pennsylvania, Department of Physics and Astronomy — We combine antibodies for Lyme flagellar protein with carbon nanotube transistors to create an electronic sensor capable of definitive detection of Lyme disease. Over 35,000 cases of Lyme disease are reported in the United States each year, of which more than 23 percent are originally misdiagnosed. Rational design of the coupling of the biological system to the electronic system gives us a flexible sensor platform which we can apply to several biological systems. By coupling these antibodies to carbon nanotubes in particular, we allow for fast, sensitive, highly selective, electronic detection. Unlike antibody or biomarker detection, bacterial protein detection leads to positive identification of both early and late stage bacterial infections, and is easily expandable to environmental monitoring.

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