## Abstract Submitted for the MAR15 Meeting of The American Physical Society

The Extended Core Coax: A Novel Nanoarchitecture for Electrochemical Sensing of Infectious Disease Biomarkers<sup>1</sup> AMY E. VALERA, MICHELLE M. ARCHIBALD, JEFFREY R. NAUGHTON, TIMO-THY CONNOLLY, MICHAEL J. BURNS, THOMAS C. CHILES, MICHAEL J. NAUGHTON, Boston College — We report the development and fabrication of a novel nanoarchitecture for electrochemical sensing, the extended core coax (ECC). Each ECC is a vertically oriented nanocoax, comprised of an extended inner metal core and an outer metal shield, separated by a dielectric annulus. The inner (gold) and outer (chrome) metals serve as the working and counter electrodes, respectively, with  $\sim 200$  nm separation gap / annulus. Arrays with a base area of 0.1 mm<sup>2</sup> were fabricated, each containing  $\sim 10^5$  individual ECCs connected in parallel. Previous iterations of the nanocoax have demonstrated  $\sim 100x$  greater electrochemical response over a planar control due to the nanoscale proximity of the working and counter electrodes [1]. We anticipate the ECC will function similarly, and offer the additional benefit of overcoming diffusion limitations due to the extended core working electrode, which protrudes  $\sim 200$  nm above the shield of the ECC. Additionally, the extended gold core provides a substrate for biofunctionalization, making the ECC an attractive candidate for further development towards electrochemical detection of infectious disease biomarkers such as cholera toxin.

[1] B. Rizal, et al., Anal. Chem. 85, 10040 (2013).

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