

Abstract Submitted  
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**Novel Bio, Chemical, Environmental Sensing Based on New Model of Total Internal Reflection in Turbid Media**<sup>1</sup> SAMIR BALI, PATRICK JUDGE, NATHAN PHILLIP, JORDAN BOIVIN, JONATHAN SCAFIDI, JASON BERBERICH, LALIT BALI, Miami University, Ohio — We have initiated a collaborative experimental research program that combines new advances in optical physics, field portable chemical analysis, and biosensing. Our goal is to discover and characterize new optical sensing methodologies in opaque, highly scattering (i.e., “turbid”) media, and demonstrate new paradigms for optical sensing in research and industry. We have three specific objectives. First, we propose to fully characterize and validate a new model of total internal reflection (TIR) from highly turbid media thus enabling a first demonstration of non-invasive, in-situ, real-time particle sizing for the case of arbitrary scattering particle size—a holy grail in colloidal science. Second, we propose to implement a first demonstration of real-time non-invasive measurement of nanoparticle aggregation in highly turbid media. Third, we propose to use our new sensing methodology to demonstrate real-time in-situ label-free monitoring of molecular interactions and adsorption at surfaces.

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