We are working towards a platform capable of parallel, rapid (10 minutes), raw sample testing for orthogonal (in this case nucleic acid and immunoassay) identification of biological, chemical, and oddly enough nuclear threats in a single sensor microsystem. Our goal is to develop a device for everyday multiple use (clinical, field) on diseases and hazards of interest. Modeling suggests that the detection aspect should be capable of multiplexing 1000's of agents. The system is being designed to be insensitive to sample pH, conductivity, and opacity. Preliminary testing has been done with ovalbumin as a surrogate, Botulinum, and Bovine Viral Diarrhea (BVD) in raw milk and other fluids. We chose BVD because our collaborators (UC-Davis) can supply samples from persistently infected animals; and because proof-of-concept field testing can be performed with modification of the current technology platform at the UC Davis research station. Since BVD is a cattle-prone disease, this research dovetails with earlier immunoassay work on Botulinum toxin simulant testing in raw milk samples. We have a limit of detection (LOD) for the botulinum toxin simulant of 50 ppb and believe this can be significantly reduced. Demonstration of BVD RNA detection expands the repertoire of biological macromolecules that can be adapted to our bead-based detection. The platform has recently been extended to include the ability to provide rapid isotopic measurements. In this seminar, we present current results and future directions of our research.