*Salmonella typhimurium* (*S. typhi*) is a prevalent bacterial species, and is estimated to cause around 33% of food-borne illness in Sub-Saharan Africa, South Asia, East Asia, and Pacific regions, affecting 762 per 100,000 person every year. To decrease food contamination in these areas, a portable and self-regenerating detection system is needed. To fulfill these needs, we designed a yeast-based detection system using synthetic biology. Our system will express an antibody to *S. typhi* via a-agglutinin complex subunits (Aga1p and Aga2p) on the surface of *Saccharomyces cerevisiae* (*S. cerevisiae*), a yeast that is both engineerable in the lab and safe to provide to households in affected areas. When the antibody presented on the surface of these engineered yeast binds to a lipopolysaccharide of *S. typhi*, it can activate the Hog1

pathway. This pathway is naturally present in *S. cerevisiae*, and will be engineered to generate a detectable signal that will provide an early warning for food contamination. Our system, if successful, will create a low-cost, self-regenerating detector for *S. typhi*. Its low cost and its capacity to reproduce will ensure greater access to our system, making food and water in third-world countries safer to consume and reducing disease.