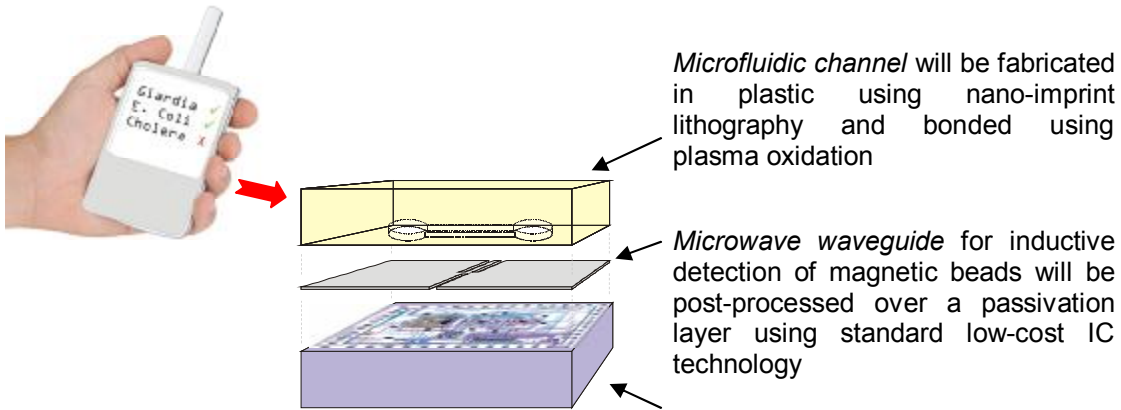


High Sensitivity Detection of Biomolecules Using Magnetic Nanobeads

The goal of this project is to develop technologies for a portable microscale sensor for ultra-sensitive detection of biological and chemical agents. The sensor will use bio-functionalized magnetic nanobeads that bind *selectively* to the target molecule via highly specific biomolecular reactions. The detection of the beads, and consequently the target molecules, will be accomplished inductively at the ferromagnetic resonance (FMR) frequency for enhanced sensitivity. A microwave circuit will be implemented to excite FMR. A simple and inexpensive sensor, where the microwave waveguide, microfluidics, and excitation and detection electronics are integrated as shown below, is envisioned.



Integrated sensor concept: A highly sensitive, inexpensive, portable and battery operated sensor for detection of biochemical toxins, pathogens and war agents is envisioned.

Supported by: ARL

Collaborators: Dr. Dhagat (Team Lead)

School of EECS, Dept. of Chemistry and Umpqua Research Company