THE UNIVERSITY OF TENNESSEE, KNOXVILLE

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Team: *Prof. J. Chen* (Public Health),
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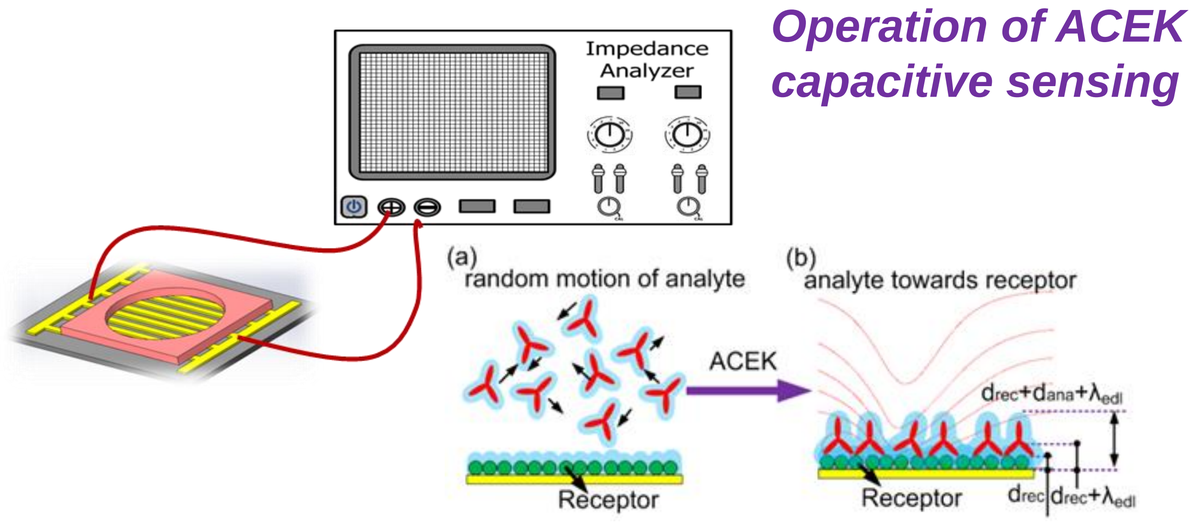
- Invented "AC electrokinetics (ACEK) capacitive sensing" for *high throughput, high sensitivity and robust affinity sensing*.
- Design, optimize, and validate various new, high performance chemical/biological assays for point of need/care applications.

Rapid Simple and Robust Affinity Sensing Platform

1. **Cheap,** < $1 material cost/per test
2. **Fast,** < 60 seconds from sample to result
3. **Highly sensitive,** >1000X more sensitive than ELISA
4. **Specific**, directly use with field/clinical samples
5. **Minimum sample pretreatment**
6. **Versatile platform technology**, - work with various small molecules, proteins, nuclei acids, pathogens and cells in different matrices.

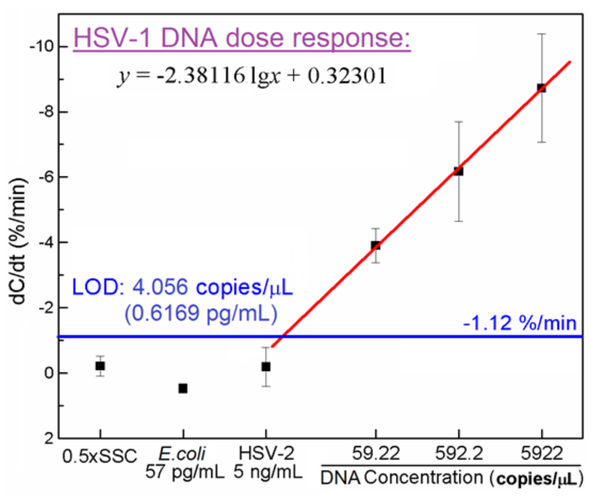
Target	Detection limit	Sample fluids	Cross-reactivity (negative)
Bisphenol-A (BPA)	50-70 aM	Serum, River Water, Canned Food	BPS, BPF, BPA metabolites
human-Tuberculosis (TB) antibody	5 fg/mL (22 aM) 5 pg/mL (22 fM)	PBS Serum	bovine-TB, Johne's Disease antibodies
Influenza A Virus particle	0.25 pg/mL	Nasal swab	Influenza B Virus
Herpes 1 virus (HSV) DNA	< 0.6 pg/mL (4 copies/μL) 20 pg/mL (131 copies/uL)	Saline-sodium citrate (SSC) buffer, Serum	HSV-2 DNA, *E. Coli* DNA
Zika virus RNA	0.42 pg/mL (78.8 copies/μL) 1.5 pg/mL (287.5 copies/μL)	SSC buffer, Serum	Dengue RNA
Bacterial particle (E.coli)	28 #/mL	Growth medium	



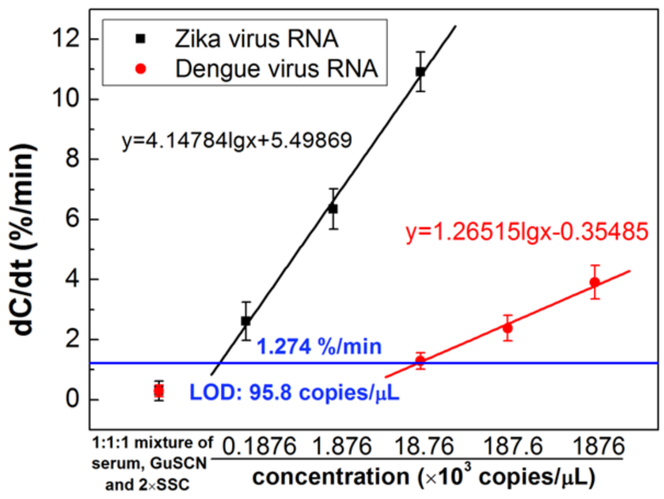
Operation of ACEK capacitive sensing

Label free, electrical sensing; Rapid and low cost; No wash; Simple and robust operation.

Whole Genome Nuclei Acid Detection



Herpes simplex virus-1 dsDNA



Zika virus RNA spiked in serum

We are seeking to collaborate with research group(s) specializing in (1) neglected tropical diseases with archived human/animal biological samples, (2) virus or bacterial gene manipulation.

Core team members:

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