



Quarksen LLC

Equanta: advancing opioid detection beyond physical presence

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MOTIVATION

The opioid crisis poses significant challenges for airport security, impacting both public safety and operational efficiency. Airports are critical nodes in the global transportation network, making them potential transit points for illicit opioid trafficking. Global drug seizures, particularly of synthetic drugs like fentanyl, have significantly increased, with the U.S. Customs and Border Protection (CBP) seizing over 11,200 pounds of fentanyl in 2021.



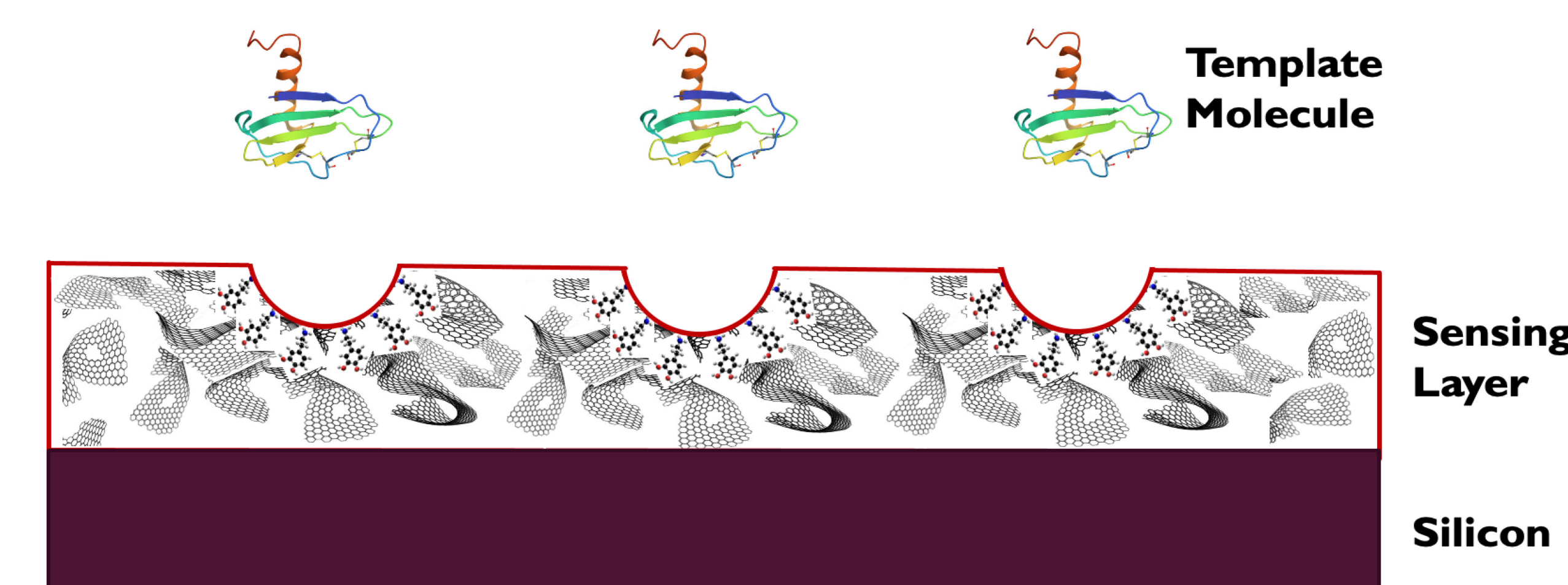
METHODS

eQuanta is a multiplexed device to detect opioids with high accuracy in an instant, non-invasive, and inexpensive way. This device is composed of 1) an array of sensors that detect one or multiple analyte/s (e.g., fentanyl, marijuana, oxycodone, etc), 2) a printed circuit board (PCB) to measure the sensors' readings and transport the data, and 3) an AI-empowered algorithm that translates the measured sensors' reactions into quantitative concentration of the detected analyte.

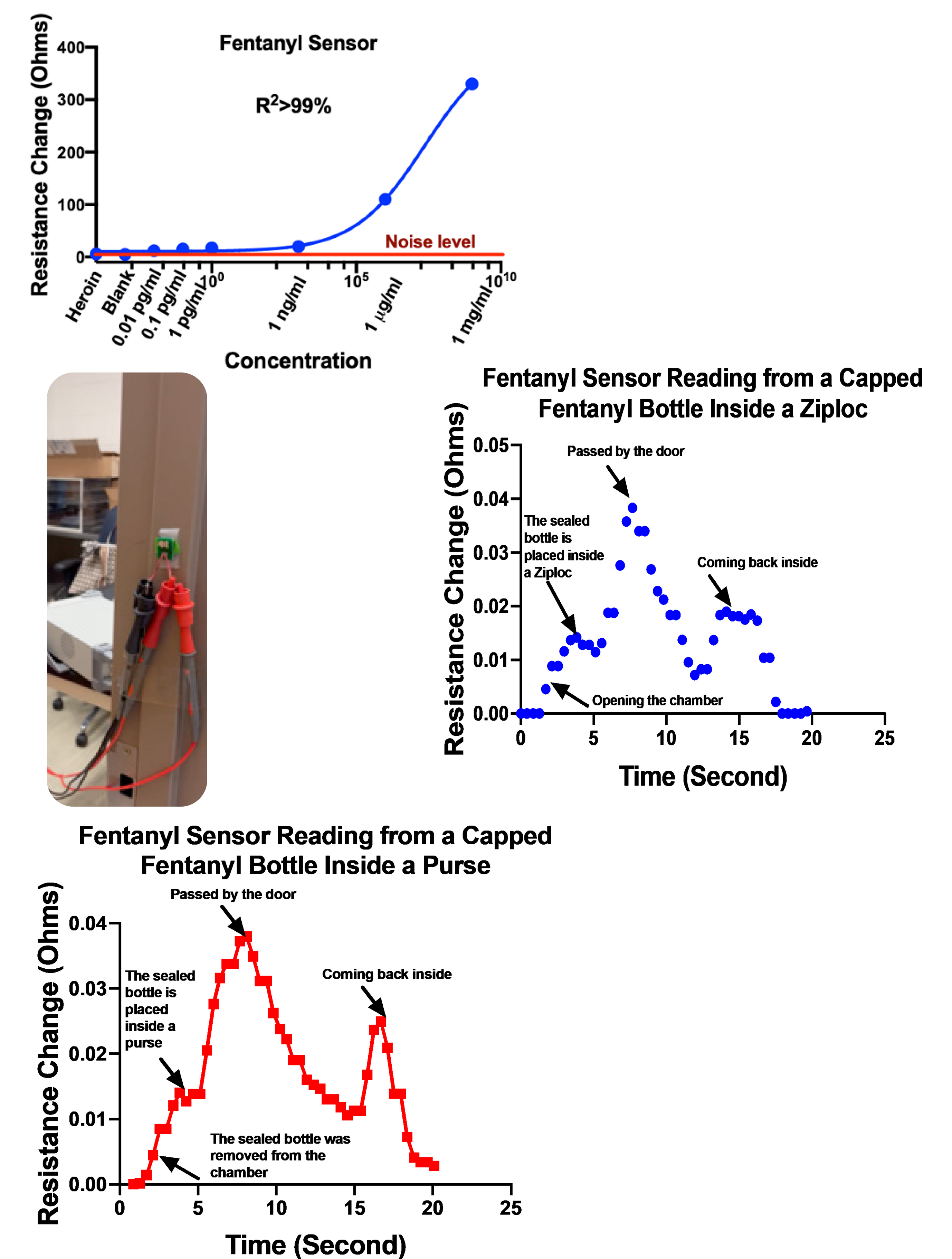
eQuanta relies on a sensing technology that uses self-assembled, sensitive, and selective cavities designed specifically for each targeted analyte. These binding sites are surrounded by graphene that serves as the main transducer.



SENSING MECHANISM



RESULTS



BACKGROUND

Traditional detection methods such as Advanced Imaging Technology (AIT) scanners, metal detectors, Explosive Trace Detection (ETD) devices, and canine units are effective for identifying certain threats but have limitations in detecting opioids, especially when they are concealed inside the body or in non-metallic forms. These methods can struggle with sensitivity, specificity, and noninvasiveness.

OBJECTIVES

- To accurately (at part per quadrillion level), instantly (within 10 seconds), and cost-effectively (\$100 per device) detect fentanyl in the air.
- This device can be applied by TSA, law enforcement and US customs and border protection.

ABOUT QUARKSEN

Quarksen has been established in 2022 in Boston MA and is a spin out from Harvard University.

Quarksen has recently received an NSF SBIR grant to work on these fentanyl sensors.

