

Smart LAMP for “no resource” infectious disease detection

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INTRODUCTION

- **Influenza** affects more than 3 million people per year, and accurate diagnosis is key to treatment as well as stopping the spread
- A simple home- or pharmacy-based flu test would allow patients to test themselves, and not spread the infection (or put themselves at risk for infection) by going to the doctor
- Rapid lateral flow diagnostic tests for influenza are easy, but suffer from low sensitivity
- **Smart LAMP** brings the sensitivity of standard laboratory tests to the privacy of the patient’s home, using their own smartphone to run the test, and share the results with their doctor

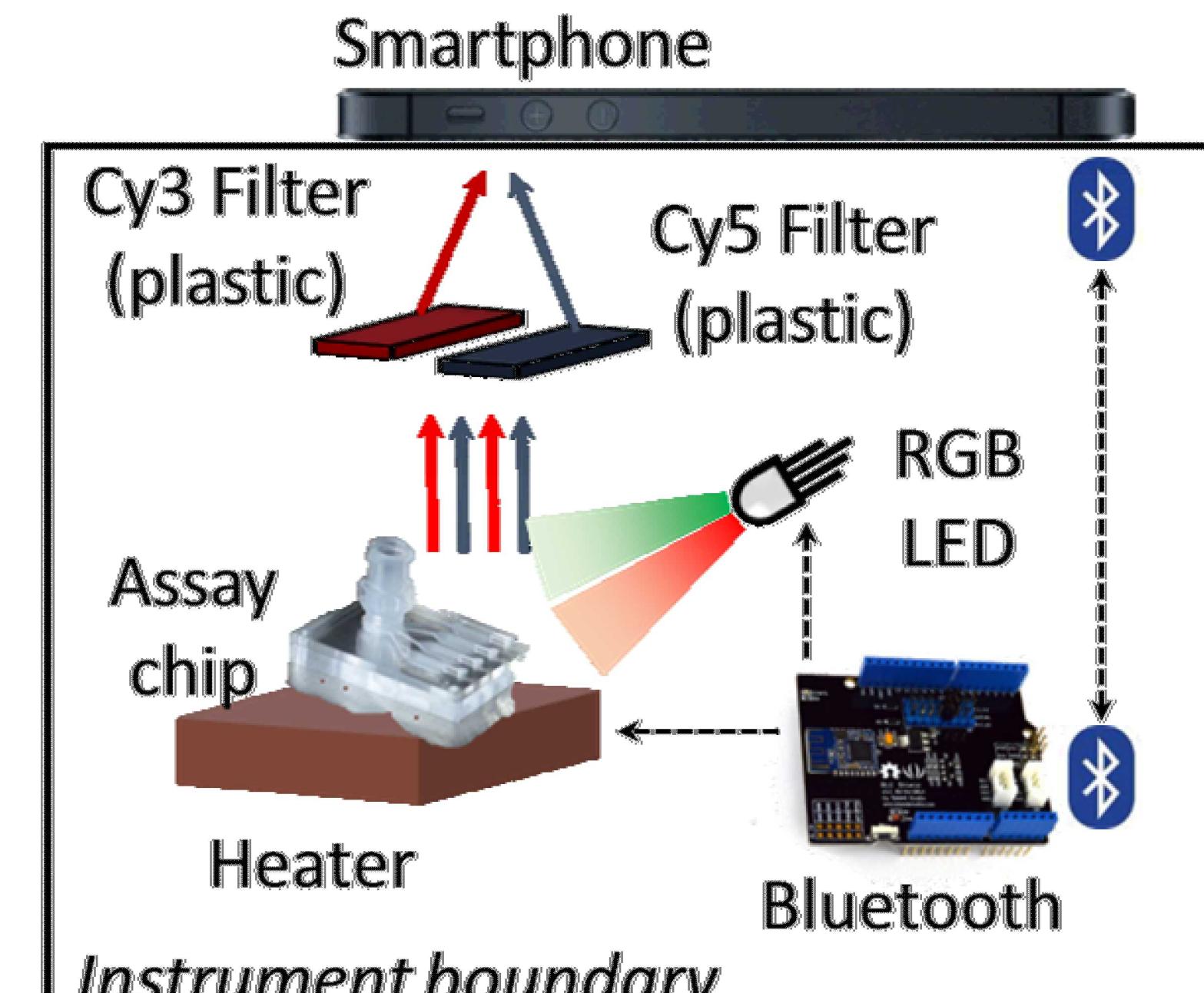
TECHNOLOGY OVERVIEW

- **Smart LAMP** uses an isothermal method to amplify RNA directly from viruses like influenza, with minimal sample prep required by the user.
- The user just collects a sample from their nose on a swab, inserts into a cartridge, inserts into the Smart LAMP reader, and uses a smartphone app to run the test.
- **Smart LAMP** utilizes proprietary chemistry and algorithms developed at Sandia that turns the camera of an ordinary smartphone into a sensitive, quantitative detector.

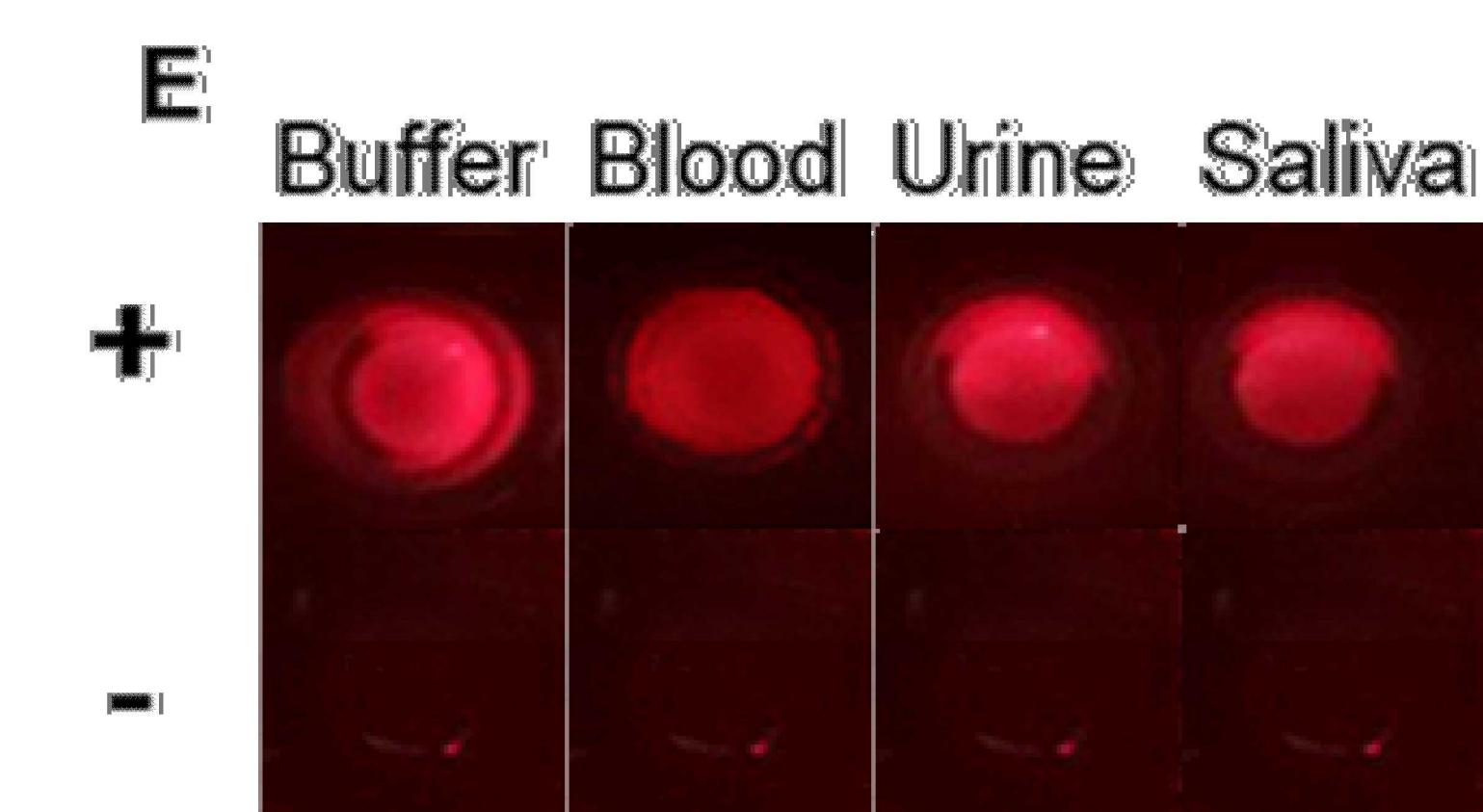
Collaborators: Cameron Ball, Aashish Priye, Yooli Light, Oscar Negrete

PRODUCT/TECHNOLOGY DESCRIPTION

The Smart LAMP instrument **uses any iPhone or Android phone** to control a simple instrument via Bluetooth



Smart LAMP has been demonstrated to detect viruses (Zika in the example below) directly from bodily fluids with *no sample prep*, making it ideal for at-home use



PRODUCT PROFILE

1. Smart LAMP is a platform technology for testing for pathogens. The initial target is influenza, but once a customer has the reader they can buy kits to test for other common viruses or bacteria as well.
2. Smart LAMP **brings infectious disease testing to the home or pharmacy**, allowing patients to test themselves.

BUSINESS MODEL

1. The Smart LAMP instrument would be a one-time purchase with a downloadable app. Single-use consumable kits for each test can be purchased separately. Target \$50 for the reader and \$20 per test.

STAGE

1. Smart LAMP currently exists as a functional laboratory prototype, but could use cosmetic improvements and redesign for low-cost manufacturing, and a professional redesign of the App.
2. Key publication: Priye *et al*, *Scientific Reports* 2017.
3. Sandia has patents pending on the QUASR detection chemistry, and on the algorithm used for interpreting smartphone fluorescence signals.
4. Smart LAMP was developed for mosquito-borne viruses like West Nile and Zika but is readily adaptable to any virus or bacteria.

ADVANTAGES

1. Capital and operating **costs reduced** through the use of any Smartphone cameras the detection device
2. No specialized training required
3. **Results securely shared** with health care providers or directly with your physician
4. **Rapid results** delivered and stored to Smartphone app

CONCLUSIONS

1. **Smart LAMP** is a platform technology with a single instrument that can allow home-based testing for many pathogens.
2. Influenza is a large market for testing with added value to patient care from accurate at-home testing.

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