RAPID
SEPSIS SENSOR

CONTACT INFORMATION
Jessica Kubicek-Sutherland
Phone: +1 (505) 665-6267
Email: jzk@lanl.gov

PREVIOUS FUNDING
LANL $5M
NIH $0.55M

SEEKING FUNDING
Total $1.5M
Pre-clinical testing $500K
Cartridges $1.0M

SEEKING PARTNERS
– Sepsis pre-clinical trials
– Disposable cartridge development
– Adapt assay to other technologies

TEAM
– Jessica Kubicek-Sutherland, PhD is a UC-LANL Postdoc Entrepreneurship Fellow and at Los Alamos National Laboratory. She has expertise in the development of bacterial diagnostic strategies.
– Aaron Anderson, MS is a scientist at Los Alamos National Laboratory. He has expertise in sensor-related chemistry, optics and engineering.
– Principle Investigator: Harshini Mukundan, PhD is a scientist and team leader at the Los Alamos National Laboratory. She has expertise in the development of diagnostic technologies.

INTELLECTUAL PROPERTY
US9835618
US20170307604A1

LA-UR-18-22430

SUMMARY
We developed a rapid and sensitive sensor for the detection of bacterial sepsis in minutes using only a drop of blood.

PROBLEM
Sepsis is one of the most common causes of death in hospitals. It occurs when the body has an extreme response to an infection. Diagnosing sepsis is difficult because its symptoms can be confused with other diseases. Early and aggressive treatment improves your chances of surviving sepsis. In fact, up to 80% of sepsis deaths could be prevented with rapid diagnosis and treatment. Unfortunately, sepsis diagnostics currently rely on blood culture in a clinical laboratory, which is time-consuming.

SOLUTION
The Rapid Sepsis Sensor sensor can diagnose a sepsis infection in minutes from a drop of blood. The sensor is ultra-sensitive, so there is no need to for a time-consuming blood culture. Detection of trace amounts of bacterial signatures directly in blood is performed using a strategy that mimics that of our own innate immune system during an infection.

MARKET
Our targeted market of sepsis diagnostics was $370M globally in 2016. The versatility of our sensing platform allows for expansion into other point-of-care infectious disease diagnostics, a total addressable market of $1.05B globally.

COMPETITORS
The gold standard for diagnosing sepsis is blood culture, which is time-consuming taking a minimum of 12 hours. Once a positive blood culture is obtained, further testing is performed using clinical laboratory instruments (bioMérieux, BioFire, etc.) to inform treatment options. Other molecular assays (Roche) can be used instead of these instruments, but these tests also require a positive blood culture sample. There are other rapid, but non-specific, methods used by clinicians to diagnose sepsis that include physiological examination (temperature, pulse rate, etc.) and testing of host factors such as lactate levels, but these are unreliable and do not inform antibiotic treatment strategies.

COMPETITIVE ADVANTAGE
Our sensor provides an accurate diagnosis in minutes that identifies the class of bacterial pathogen causing the infection (Gram-negative, Gram-positive, or Gram-indeterminate), which can directly inform the treatment strategy without the need for blood culture. A rapid diagnosis allows for immediate treatment, which saves lives.

GO TO MARKET
The Rapid Sepsis Sensor sensor has been developed and each assay has been validated individually. These assays need to be combined into a single multiplex format to run simultaneously and then validated in a pre-clinical study. Then the test cartridges for use in the clinic will need to be designed, tested and manufactured for use in a class II device clinical trial for FDA approval.