TCS/19/46 - Rapid new methods for sepsis diagnosis in hospitals using microsystems

Sepsis is a life-threatening consequence of infection that kills 3,500 people every year in Scotland. Due to the high risk of death, multiple broad-spectrum antibiotics are routinely used in patients with sepsis, which contributes to the development and spread of antibiotic resistance. Current methods to identify the underlying infection and target treatment require growth tests, which take several days to establish a positive result. Rapid diagnosis of the infecting bacteria would enable the use of the right antibiotics straight away, reducing the risk of complications for the individual patient, and benefiting society by reducing use of last-resort broad-spectrum drugs. This project aims to tackle the challenge of rapid diagnosis by engineering a miniaturised, portable platform that will isolate bacteria from clinical samples within minutes, without prior knowledge of their identity or growth tests. Importantly, this approach will be coupled to technologies already available in hospitals and new genome-sequencing technologies to perform bacterial identification and antibiotic susceptibility testing in a much-reduced timeframe.