



## Saving patients' lives with maths

► Using an ECG signal to detect sepsis in patients

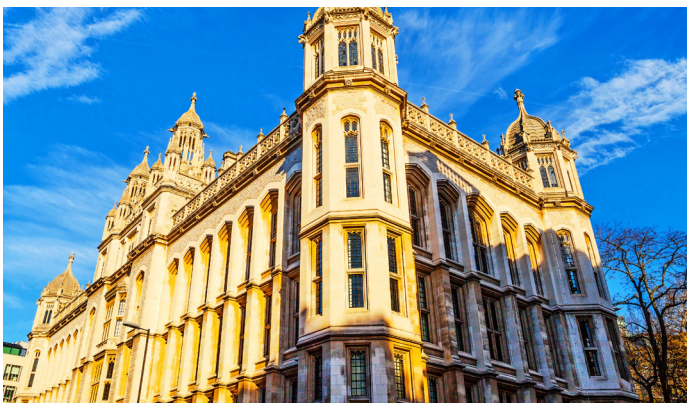
Academic: *Dr Philip Aston*

Over 37,000 people die every year in the UK after contracting sepsis, and detection is often too late for successful treatment. A project at the University of Surrey has demonstrated that diagnosing patients by analysing an ECG signal using a novel mathematical method could be the key to early diagnosis.

The IAA project, conducted in collaboration with King's College London and Data Sciences International (DSI), built on previous work which demonstrated that sepsis could be detected early by analysing blood pressure signals. The drawback of blood pressure monitoring is that it is invasive (with a catheter inserted into a blood vessel). In this project, the method was therefore adapted to use an ECG signal which is monitored non-invasively (using a skin-patch), and more routinely, in hospitals.

The researchers have successfully developed code for analysing ECG signals and are now testing this, using data from animal models and patients, to see if it can robustly predict the early development of sepsis.

This technique can potentially be applied to a diverse range of clinical scenarios, including the detection of cardiac arrhythmias or adverse effects of drugs on the heart. It has already been tested on patients' responses to verapamil (a drug which alters heart contraction) using DSI archive data.



Dr Aston says:

**“The next step will be to develop a system that uses the data to automatically monitor patients, triggering an alert such as a red light when certain criteria are met. Being able to monitor patients automatically and analyse the results in real time could potentially save lives.”**