

# New algorithm will allow better heart surgery

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A new technique to help surgeons find the exact location of heart defects could save lives, help them to treat patients more effectively and save health service cash.

The development, by researchers at The University of Manchester, will allow non-invasive detection of the origin of [heart problems](#) and allow more [effective treatment](#). Currently it is hard to pinpoint the exact location of [heart defects](#), meaning patients have to spend extra time in the theatre as the surgeon finds the problem. The more time taken in surgery, the more likely problems are to develop, adding extra danger for patients and expense for the NHS.

Now the team at Manchester have come up with a new algorithm which will enable medics to exactly find the area of concern before any surgery takes place. In the form of a type of electrocardiogram (ECG) map, once created, the algorithm will detect the origin of the [heart](#) defect, cutting the amount of time in surgery for some patients.

In a paper published today in *PLoS Computational Biology*, Professor Henggui Zhang describes how the new algorithm had a success rate of 94%. Using 3D computer modelling of the [human heart](#), it correctly identified the origin of the problems in 75/80 of the simulations, a much better rate than current technology. In effect the new method will increase the resolution of the map, enabling much more accurate diagnosis. The next stage is to test it in the real world.

Henggui Zhang, Professor of Biological Physics at The University of

Manchester and lead author of the study, said: "The standard way we do electrocardiograms does not provide sufficient information to enable medical professionals to focus in clearly to the area of concern.

"This is a problem because the heart is so complex, so it can be hard to pin down exactly which part is causing the problem with current diagnosing technology. That means more time in surgery, more chance for things to go wrong and worse outcomes for patients.

"What we have come up with here is a significant improvement over previous techniques. Using this new algorithm ECG map can help diagnose the location of cardiac disorder in a way which is better for the patients and more cost effective for health services."

**More information:** Alday EAP, Colman MA, Langley P, Butters TD, Higham J, et al. (2015) "A New Algorithm to Diagnose Atrial Ectopic Origin from Multi Lead ECG Systems - Insights from 3D Virtual Human Atria and Torso." *PLoS Comput Biol* 11(1): e1004026. [DOI: 10.1371/journal.pcbi.1004026](https://doi.org/10.1371/journal.pcbi.1004026)

Provided by University of Manchester

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