



## Stevie's PhD Journey

### Maths, medicine, and machine learning

With a Master of Mathematics from the University of Surrey, Stevie Creasy's research explored the use of machine learning to detect atrial fibrillation post-episode, achieving an impressive 86.5% classification accuracy. Funded by the NIHR Applied Research Collaboration Kent, Surrey and Sussex (ARC KSS), Stevie's journey was marked by both academic and personal growth, culminating in a publication in *Heart Rhythm O2*. Now working as a Countermeasures Development Engineer at Mass Consultants Ltd, Stevie is applying data interpretation and research skills in an industry setting.

#### **Tell us about the research that you did as part of your PhD? What were the highlights of your PhD project?**

Atrial fibrillation (AFib) is a common type of heart rhythm problem where the heart's upper chambers (atria) beat irregularly and rapidly, causing the heart rate to be irregular and sometimes fast. While not usually life-threatening in itself, AFib can increase the risk of a stroke, heart failure and other complications.

My research looked to understand if machine learning techniques could be used to detect atrial fibrillation in patients after an episode and when they had returned to sinus rhythm. By taking an electrocardiogram (ECG) recording and using computational analysis we were able to determine with high accuracy which patients were controlled and which had experienced AFib. A particular highlight was being able to combine methods that had previously been used as standalone to detect AFib and combine them in a way that improved the overall accuracy. Our best result saw 86.5 per cent of patients classified correctly.

#### **What inspired you to undertake a PhD? How long did it take you to complete? And, how did you fund your studies?**

Completing my masters dissertation gave me an indication of what a PhD would be like, when I heard about the project, I knew it was something that I was interested in getting involved in.

Both my dissertation and one of my final year projects focused on applying maths to medicine, so I knew this was something I wanted to continue. I completed my PhD in 3.5 years with funding from the National Institute for Health and Care Research (NIHR) Applied Research Collaboration Kent, Surrey and Sussex (ARC KSS).

## How would you describe your journey as a PhD student? The highs? The challenges?

My PhD journey was as much about personal growth as it was about completing the project. I started in a field that was different to my undergraduate degree, so it was easy to feel overwhelmed by the sheer amount of research in my field alone. However, with the direction of my supervisors I was able to gain a good understanding of the current area and start to make my own decisions on how I thought my research could progress (rather than just following the original direction). A particular high was having my paper *Investigating the impact of sampling frequency on complexity analysis* published in the *Heart Rhythm O<sup>2</sup>* journal. Not only was this a significant contribution to my thesis but it also reinforced that I was on the right track with my work and it was having a real impact.

## What advice / tips would you give someone thinking about taking a PhD?

If research is something that interests you, find out what projects your lecturers are offering. Often the modules they teach are directly linked to their field of research, so you'll already have a step up. There will be times it feels tough because there will be questions that haven't been answered yet. Keep pushing through because the feeling of being able to answer those questions is it like nothing else, you'll experience in academia.

## Now that you have graduated, what's next? What are your plans for the future?

I have recently started a job as a Countermeasures Development Engineer with Mass Consultants Ltd. It has provided me an excellent platform to use my skills in interpreting data sets and researching topics in an industry setting.