The heart plays a crucial role as a pump that ensures blood circulation throughout the body. To initiate each contraction, the heart must first trigger electrically, followed by relaxation or the heart's electrical recovery. The electrical initiation of the heart well described and understood, but the electrical recovery is less well understood. To monitor the electrical function of the heart, we use an electrocardiogram (ECG), which is recorded approximately millions of times daily worldwide as a screening method in cardiac diagnostics. The interpretation of the electrical recovery of the heart, the T-wave in the ECG, is limited. Clinically there are 4 most common classifications used for the T-wave: a) normal T-wave, b) negative T-wave, c) flat T-wave, or d) peaked T-wave (Figure 1).

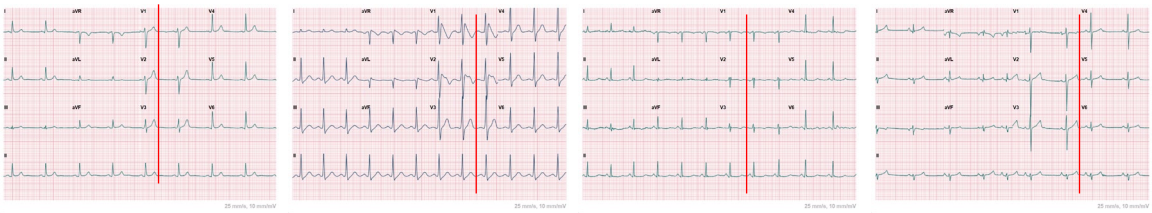

Figure 1 Examples of (from left to right) a normal T-wave, a negative T-wave (Brugada patient), flat T-waves in a Long QT patient, and peaked T-wave (hypertrophic cardiomyopathy patient). The red line indicate the end of the T-wave

One reason why a proper interpretation of the T-wave is important is that missed abnormal recovery could lead to fatal cardiac arrythmias, or sudden cardiac death. Such fatal arrhythmias happen in Poland about 16000 times a year, also in very young people. This research aims to improve the interpretation of the T-wave by linking the T-wave morphology from the ECG to the anatomy of the heart. Such anatomical link might provide insights in the mechanisms and potential risk a patient has on the development of a fatal arrhythmic event. The aim of this project is with the improved insights in the interpretation of the T-wave morphology we can potentially estimate the risk for an arrhythmic event.