Lethal electrical rhythms of the heart are the leading cause of unexpected sudden death and can occur at any age. In this talk I will review the importance of electrophysiology and describe recent progress our group has made in using magnetocardiography to diagnose life-threatening cardiac arrhythmias in the fetus. I will also describe a new type of magnetometer, based on atomic physics principles, that has the potential to revolutionize magnetocardiography and other areas of biomagnetism.