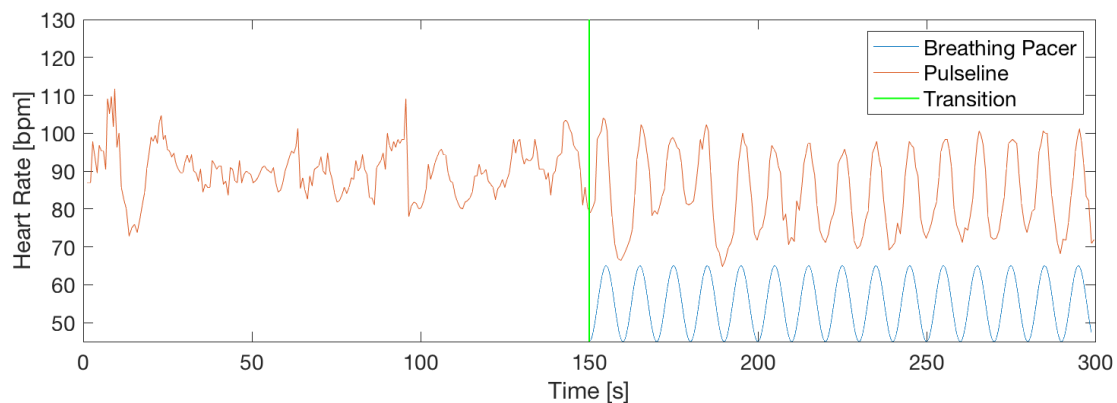


BSc/MSc-project for students in Biomedical Engineering, DTU/KU

Title: Resonance in the cardiovascular system

Introduction: The National Institute of Public Health in Denmark estimates that approximately 16.8% of danish workers are stressed in their daily life, and thus mental stress remains one of the main challenges in workplaces of today. One potential solution which has gotten a lot of attention recent years is biofeedback intervention, namely heart rate variability biofeedback (HRVB). The idea is to push the cardiovascular system (CVS) is into a state of resonance, increasing the parasympathetic activity in the autonomic nervous system. The figure below demonstrates the change in pulseline trend when the CVS is going into a state of resonance at the green 150 second mark.



Project Description: To design, plan, recruit, carry out, and analyse a scientific study. Three different biomedical signals will be measured; Respiration, electroencephalography (ECG) and photoplethysmography (PPG), and use a machine learning approach to estimate their individual baroreflex delay.

Project Aim: To determine the delay between the baroreceptor and the cardiac response.

- Is ECG and PPG equally fit for estimating the baroreflex delay
- What is the impact of the psychological delay between subject perception of pacer and actual pacer?

Prerequisites: Experience with matlab and signal processing.

Supervisors: Assoc. Professor Jørgen Kanters MD, Jonas L. Isaksen M.Sc, Mathias P. Bonnesen M.Sc

Contact: Mathias, Resilio, m@resiliohq.com, Jonas L. Isaksen, jonasisaksen@sund.ku.dk