

## Comparison of Radar, Seismograph and Ballistocardiography and to Monitor Sleep at Home

**Background:** World-wide, the life-expectancy of people is increasing. Due to balanced diet and less physically demanding jobs, elderly people stay longer healthy. Also, supporting services like Spitex allow them to live longer in their own homes. All in all, it is safe to say that quality of life for elderly people has been increasing steadily over the last years. On the other hand, this development has led to new challenges. Whether it's because of early-stage dementia or e.g., symptoms of Parkinson's Disease, it is often crucial to observe people's sleep behavior within their home (i.e., vital signs and movement). Know that people are living longer in their own homes, new solutions for home monitoring need to be developed. Promising technologies are the radar and seismograph technology, which are installed in the instrumented apartment at the Sitem-Inselspital.

**Aim:** Therefore, the aim of this project is to develop an algorithm to measure heart and respiration by radar and seismograph by comparing to the gold standard ballistocardiography.

### Materials and Methods:

This thesis will consist of four parts. In the first part, the student will learn the concepts of the radar and seismograph technologies. In a second step, in an experiment a data set of healthy subjects is created. Third, algorithms to measure vital signs and movement will be developed. At the end the radar and seismograph system will be compared to the gold standard ballistocardiography.

### Nature of the Thesis:

Development of algorithms to process the data: 60%

Experiment: 10%

Analysing of the experiment data: 30%

### Requirements:

Basic knowledge in data analysis

Good programming skills

Interest to work with healthy subjects

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**Figure:** Apartment where the experiment will be conducted