Background
• Sleep apnea (SA) – affects about 4% of the population, may cause various medical complications (fatigue, T2D, etc.); accompanied by body or leg movement.
• Huge demand for technology solutions and new care models.

Material & Methods
• Non-invasive piezoelectric-based under mattress and PIR sensors.
• Data processing and SA detection is performed by machine learning algorithms on the edge nodes.
• Anonymized data to the cloud for assessment by medical experts.

Results
• An experiment for continuous sleep monitoring of a single person with sensors over a period of 8 hours has been conducted.
• Signals were segmented, 250 to 270 signal features extracted and then reduced to the most important 32.
• 4 machine learning algorithms were applied and results compared.
• The accuracy of the different classifiers based on different sliding window configurations has been analyzed.
• As windows length increases, the accuracy increases too (5 sec – 90%, 10 sec – around 90%, 20 sec – above 95%).
• Ack: COST CA16226 SHELD-ON.

Conclusion
• Using unobtrusive sensors and fog computing can improve patient-centered care for patients with sleep apnea.
• Flexibility of fog architecture enables better placement of computing and network resources.
• Accuracy increasing for larger window length can be used for system design doing several predictions simultaneously.
• This proof the concept has been done with 3 patients only, which has to be increased in future.