

## **EPUAP Project report**

Both the Skin Health research group of the University of Southampton led by Professor Dan Bader and the research group of the University of Grenoble – Alpes led by Professor Yohan Payan are grateful to EPUAP for awarding this prestigious prize to facilitate an exciting collaborative project. This has enabled the Skin Health researchers and in particular the PhD student Silvia Caggiari, to gain new knowledge in a field where methodologies related to machine learning have the potential for exploitation for analysing pressure data at the body – support surface interface. Specifically, her goal was to create machine learning-based algorithms to identify a range of different postures from pressure distributions estimated from a commercial measurement system during prolonged lying postures.

The three visits to the TIMC-IMAG laboratory of the University of Grenoble and the visit of TIMC-IMAG group to the Clinical Academic Facility at the University of Southampton mainly focused on learning the fundamentals of machine learning for application of technologies to promote pressure ulcer prevention. Under the supervision of Professor Payan, a pilot version of an algorithm involving data sets acquired from a cohort of able – body volunteers, has been developed to predict postural changes and classify supine-lying postures. These data sets involved time –related biomechanical parameters estimated from pressure distributions, such as contact area, centre of pressure, and signals estimated from a commercial actimetry system, reflecting tilt angles of the trunk. The results obtained revealed a high accuracy in the classification of different postures, which involved movements of the head of the bed angles (up to 60 degrees) and lateral tilt postures. In combination with physiological responses from loaded skin tissues, these findings will be incorporated into an algorithm to estimate the frequency and magnitude of movement, providing the means to objectively monitor pressure ulcer risk. This will offer a more robust analysis of data than is currently employed in these associated clinical technologies, which use an arbitrary threshold for interface pressure of 32 mmHg.

The work will be written up for a publication in an international scientific journal and will also constitute a chapter in the PhD thesis due to be submitted at the end of 2019.



Pavillon Taillefer, where the TIMC-IMAG laboratory is based.



Going to the office....



Grenoble