TUM SENSELAB
Quantifying Spatial Wellbeing

Announcement for Architecture, RNB, or Biomedical Engineering Students*
Master Thesis or Study Project

SUPERVISION
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* Students from other disciplines are still encouraged to apply. Please make sure that we can officially supervise your studies.

EFFECT OF EXPOSURE TIME ON THERMAL BEHAVIOUR: A PSYCHO-PHYSIOLOGICAL APPROACH

CONTEXT

Definition of "comfort" has long been a question for professionals of the built environment. Particularly the numerical definition of it, not only decides how we operate our buildings, therefore manage resources but also how the buildings impact our well-being in return. However, this reciprocal relationship still lacks clarity on certain aspects, as research shows that occupants are consistently dissatisfied with the indoor climate and that most buildings struggle with huge performance gaps between simulations and actual measurements.

As the majority of data acquired in the comfort literature comes from user feedbacks, there are concerns with bias, data resolution, or scalability. Furthermore, it is proven by the research that maybe comfort is not what we should be after, but rather health - and not always these two mean the same thing.

Therefore, research project SenseLab aims to tackle the comfort definition from a newly emerging point of view: Directly looking into the human body. By doing so, we believe that we might not only identify the link between perceived comfort and its physiological markers, but also collect long-term data to observe how the indoor environment impacts our health and well-being.

TASKS

For this call we are looking for a student to carry out a controlled experiment in the SenseLab, where we will replicate and extend a previous experiment. During the 6 week-long experiment, physiological data (skin temperature, electrodermal activity and heart rate) will be collected under controlled temperatures. After the completion of the data-collection, preliminary analysis and visualisation of the data is expected to illustrate how the physiological data differs over time and under different conditions. The protocol and partial findings of the first experiment can be found here:

Bilge Kobas; Sebastian Clark Koth; Kizito Nkurikiyeyezu; Giorgos Giannakakis; Thomas Auer. 2021. "Effect of Exposure Time on Thermal Behaviour: A Psychophysiological Approach." *Signals* 2, no. 4: 863-885.
https://sciprofiles.com/publication/view/07227a76dd9cc1557c17c40107ff2ce8

For the data collection phase, no specific experience is required. For the analysis and visualisation part, some preliminary knowledge of Python with relevant libraries (ie. Pandas, NumPy, SciPy Matplotlib/Seaborn, etc.) would be beneficial.