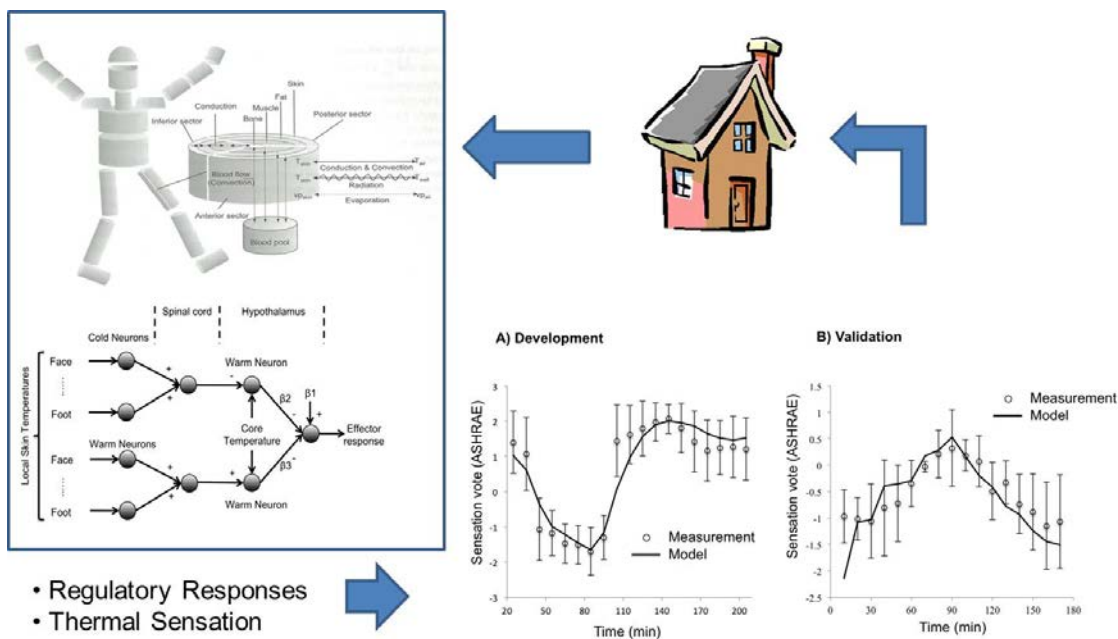


Beyond the thermal comfort limits

Towards healthy, comfortable and energy-neutral houses

Human thermal comfort depends on many thermal processes. Optimal thermal comfort requires a thermal equilibrium between the human body and its surroundings. Since the 1960s, computer models are used to assess thermal comfort of people in a building. They incorporate the processes of heat exchange to calculate thermal sensation and thermal comfort. These models are based on mean physiological values for a large group of people, mainly young male adults. Building designs are based on these values and therefore offices and houses are comfortable for the majority, but not all people feel comfortable under these average conditions. Elderly, for example, are known to have a lower metabolic rate and therefore like a higher room temperature. There even is a gender difference in comfort perception. These uniform comfort standards, which lead to minimal variation in operative temperatures for all types of buildings regardless of the climate or occupants, are nowadays criticized, especially due to the high-energy consumption of such buildings. Adapting a building to the needs of a certain group, requires a more detailed insight in individual variations in thermal comfort. Also energy reduction can be achieved by an adaptive control strategy for the indoor climate. That is why we study individual variations and dynamic aspects of thermal comfort.



Goal

In this graduation project the focus will be on the study of heat transfer between skin, clothing and the environment. The effects of a variable thermal environment will be incorporated in the project. The results will feed the development of the mathematical thermal sensation model ThermoSEM. With this model we will be able to predict thermal behavior under dynamic living circumstances.

More information:

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