

Einladung zum Vortrag

Hierarchical modeling of the heart within the circulation system

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Cardiac contraction originates at a subcellular - molecular, indeed - scale, within specific components of the cardiomyocytes (i.e. cardiac cells) called sarcomeres. This contractile behaviour then needs to be integrated at the organ level, namely, with a specific structure and shape. Furthermore, this organ strongly interacts with other physiological components, the first of which being blood circulation via the cardiac function itself, and also the nervous system that controls the heart via various regulation mechanisms. All these interactions must be adequately represented in order to obtain accurate and predictive model simulations. This presentation will provide an overview of recent advances on cardiovascular modeling achieved in the author's group, with a particular focus on the key multiscale, multi-physics and integrated system modeling aspects that need to be considered for addressing actual applications - clinical, in particular. Of major importance in this regard, hierarchical modeling - i.e. the approach by which model components are consistently devised within families of adjustable descriptive level and associated complexity - will be discussed.

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