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COMPUTATIONAL SOFT TISSUE CARDIAC MECHANICS

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ABSTRACT

Cardiovascular diseases continually challenge modern medicine, placing a strain on healthcare systems worldwide. Heart disease aetiology is often complex, multifactorial, and dependent on other organ systems, requiring tailored treatment plans. Exacerbating this challenge is the complexity of cardiac structure, function, and mechanobiology, all of which play a significant role in maintaining cardiac output.

Computational modeling of cardiac function both enables improvements in our understanding of fundamental physiology and also facilitates clinical translation [1]. By permitting the exploration of relationships between different physical mechanisms, multiscale phenomena and function, computational modeling provides a viable platform for improving patient outcomes. However, successful exploitation of computational modeling of the heart demands integration of core technologies and knowledge spanning a broad spectrum of disciplines. Addressing the multitude of challenges facing translation in the heart requires advancement of biomechanical modeling in a diverse, yet complementary, array of subjects. This mini-symposium seeks to review the latest state-of-the-art topics including:

- **Biophysical / constitutive models**
- **Physics-based models**

- **Whole-organ models**
- **Numerical methods / analysis**
- **Data assimilation**
- **Translational models**

This mini-symposium will thereby provide a forum to highlight the latest developments in these disparate, yet synergistic, emphasis areas as well as outline current challenges. Collecting participants with broad expertise, this symposium will give attendees a clear vision of the landscape of biomechanics, mechanobiology, and translational research in the heart. The symposium will also provide a unique environment for cross-talk, enabling the sharing of novel ideas and expertise necessary for the future advancement of biomechanical modeling in the heart.

REFERENCE

[1] R. Chabiniok et al. *Multiphysics and multiscale modeling, data–model fusion and integration of organ physiology in the clinic: ventricular cardiac mechanics.* Interface Focus, 6:20150083, 2016.