Numerical Modeling and its Solution Techniques for Multiphysic and Multiscale Heart Simulator : *UT-heart*

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Abstract

In the post-genome era, the integration of molecular and cellular findings in studies into the functions of organs and individuals is recognized as an important field of medical science and physiology. Computational modeling plays a central role in this field, which is referred to as Physiome. However, despite advancements in computational science, this task remains difficult. In addition to coupling multiple disciplines, including electricity, physical chemistry, solid mechanics and fluid dynamics, the integration of events over a wide range of scales must also be accomplished. Our group, including clinical practitioners, has been tackling this problem for over a decade, with a focus on the human heart. In this talk, we will introduce numerical modeling applied in our multiphysics and multiscale heart simulator *:UT-heart* and its efficient solution techniques. We will also discuss the performance of the simulator on K-computer.

Acknowledgements
This study was supported by the Japan Science and Technology Agency under the grant Collaborative Development of Innovative Seeds-Practicability Verification Stage, and the Japan Society for the Promotion of Science (JSPS) through its "Funding Program for World-Leading Innovative R&D on Science and Technology (FIRST Program)."