

Multiscale computing on distributed resources and on HPC

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Over the last five years we have established a Multiscale Modelling and Simulation Framework, and demonstrated its capabilities by performing a large number of multiscale simulations with applications from domains ranging from fusion and astrophysics to the life sciences and biomedicine. In this lecture I first introduce a representative multiscale application from Biomedicine, the Virtual Artery, and driven by that example, then show the Multiscale Modelling and Simulation Framework 'in action', and finally introduce two modes of multiscale computing, namely Distributed Multiscale Computing and High Performance Multiscale Computing. Next, I will introduce the concept of generic Multiscale Computing Patterns and their role in High Performance Multiscale Computing. Finally I will discuss the mapping between these Multiscale Computing concepts and dedicated middleware, tools, and HPC resources, and highlight the pivotal role played by Polish centres in turning these concepts into operational execution environments.