



Challenges and Bottlenecks for a Clinical Use of the Biomechanical Digital Twins

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Abstract. This invited talk will address the design of biomechanical models of living organs, in the context of computer assisted medical interventions. Many models have been proposed by research labs around the world but very few have been transformed into medical devices that are used in the clinical routine. Two main bottlenecks seem to explain this and will be discussed during the talk. First, it is known that each organ model should be patient-specific, both in terms of geometry of the organ and in terms of constitutive parameters of tissues included in the organ model. Such a personalization of the models can be extremely time consuming and therefore not compatible with the clinical constraints. Secondly, each patient-specific organ model has to be used by the clinician in an interactive way, with simulations that should not require more than a couple of seconds or minutes to compute. Here again, this can be very challenging when complex hyper-elastic models are used.