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Digital Twins in biology and medicine: bridging experimental models, simulation, and health systems

Wednesday, 4 March 2026 14:00 (45 minutes)

In silico and in vitro technologies are complementary to traditional biological and biomedical tools, enabling the study of multifactorial processes under controlled conditions. In the first part of this talk, I will present examples from bone and joint degeneration and regeneration research, where we combine computer modeling and simulation with microphysiological systems to better understand pathophysiological processes and design regenerative strategies.

In the second part of the talk I will put this work into the context of ongoing work in the European Virtual Human Twins (VHT) initiative, which aims to facilitate the development, credibility assessment, and uptake of digital twins in all areas of health & care, including the basic biological and biomedical research. The recently concluded EDITH Coordination & Support Action brought together the entire VHT ecosystem (including academia, industry, patients, healthcare providers, regulators, payers, policy makers etc) to jointly create a roadmap towards the realization of the VHT. The roadmap ([doi:10.5281/zenodo.14769224](https://doi.org/10.5281/zenodo.14769224)) provides the context and identified stakeholder needs, followed by a description of the required technology and infrastructure. It continues with a thorough discussion of the relevant standards, regulatory, health technology assessment, legal, ethical and social aspects, as well as the business elements and general incentives. It ends with 30 recommendations that have been formulated for all stakeholders to help advance this moonshot initiative and create a tangible impact on the life of patients.

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