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Computational Horizons in Cancer (CHIC): Developing meta- and hyper-multiscale models and repositories for *in-silico* oncology - Strategies, systems and results

Developing robust, reproducible, interoperable and collaborative hyper-models of diseases and normal physiology is a sine qua non necessity if rational, coherent and comprehensive exploitation of the invaluable information hidden within human multiscale biological data is envisaged. Responding to this imperative in the context of both the broad Virtual Physiological Human (VPH) initiative and the paradigmatic cancer domain, the large scale integrating transatlantic CHIC project develops a suite of tools, services and secure infrastructure that supports accessibility and reusability of VPH mathematical and computational hypermodels. These include a hypermodeling infrastructure consisting primarily of a hypermodeling editor and a hypermodeling execution environment, an infrastructure for semantic metadata management, a hypermodel repository, a hypermodel-driven clinical data repository, a distributed metadata repository and an *in silico* trial repository for the storage of executed simulation scenarios. Multiscale models and data are semantically annotated using ontological and annotating tools. An image processing and visualization toolkit and cloud and virtualization services are also being developed. In order to ensure clinical relevance and foster clinical acceptance of hypermodeling, the whole endeavor is driven by the clinical partners of the consortium. Innovative cancer hypermodels are collaboratively developed by the consortium cancer modelers and provide the framework and the test-bed for the development of the CHIC technologies. Clinical adaptation and partial clinical validation of hypermodels and hypermodel oncosimulators are under way. Indicative strategies, algorithms, systems, results as well as the outcome of clinical adaptation and partial clinical validation of hypermodels are presented.

Biography

Georgios Stamatakos received the Diploma degree in Electrical Engineering from the National Technical University of Athens (NTUA), Greece, the MSc degree in Bioengineering from the University of Strathclyde, Glasgow, UK and the PhD degree in Physics from NTUA. He is a Research Professor at the Institute of Communication and Computer Systems (ICCS), NTUA. He is the Founder and Director of the *In Silico* Oncology and *In Silico* Medicine Group. He is the coordinator of the EU-US large scale integrating research project "CHIC: Computational Horizons in Cancer: Developing Meta- and Hyper-Multiscale Models and Repositories for *In Silico* Oncology" FP7-ICT-2011-9, (600841).

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