



12th IEEE International Conference on Bioinformatics and BioEngineering

November 11-13 | Larnaca, Cyprus
<http://bibe2012.cs.ucy.ac.cy/>

Call For Papers for Special Session on

Computational solutions to large-scale data management and analysis in translational, personalized and predictive medicine

Medicine is undergoing a revolution that is transforming the nature of healthcare from reactive to preventive. The changes are catalyzed by a new systems approach to disease that focuses on integrated diagnosis, treatment and prevention of disease in individuals. This is expected to replace our current mode of medicine over the coming years with a personalized and predictive treatment. While the goal is clear, the path is fraught with challenges.

Our success in addressing these challenges depends on our ability to properly interpret the large-scale, high-dimensional data sets that are generated by modern technologies, manage dimensionality problems and extract meaningful prognosis/ diagnosis biomarkers, since it is becoming increasingly clear that a comprehensive analysis of biological systems requires the integration of all fingerprints of cellular function: genome sequence, maps of gene expression, protein expression, metabolic output, and in vivo enzymatic expression (activity). This need for integration is especially clear in the case of complex, multifactorial diseases, such as cancer.

At the same time the Virtual Physiological Human (VPH) framework aims to define models and technologies that once fully established will enable the investigation of the human body as a whole, eventually leading to a better healthcare system that offers personalized care solutions, more holistic approach to medicine and a preventative approach to the treatment of disease. Although consensus exists about what the fundamental tools are (integration of high-throughput data from several biologic scales, high-definition imaging, and computational modeling), no such consensus exists as to what are the most promising scientific approaches in responding to these challenges.

A growing awareness is found that, despite significant technological advances in various domains of relevance, fundamental obstacles separate systems biology from clinical applications. Bridging these gaps will require a focused and concerted effort in addressing various questions, such as:

- What defines systems medicine as a discipline?
- What should it seek to accomplish?
- How to develop optimal frameworks for large-scale data sharing?
- How to develop optimal frameworks for large-scale data sharing distributed scientific collaboration and collective research efforts?
- How to exploit data from hospital information systems, EHRs and PHRs and how to curate these data?
- How should knowledge from disparate sources be assembled into ontologies relevant to systems medicine?
- How do you develop and evaluate appropriate algorithms for marker selection, diagnosis and prognosis?
- How do you develop and evaluate appropriate algorithms for marker selection, diagnosis and prognosis as well as therapeutic agent, identification and evaluation?
- How do you manage the problems of dimensionality?

- How are multiscale data to be synthesized by corresponding multiscale models?
- How should models be represented, stored, managed and shared?
- Health recommender systems: How to deliver personalized health information?
- What is the burden of proof that such models are valid and predictive of clinically relevant outcomes?

Furthermore, because of the necessary multiscale nature of the models bridging embedded levels of organization from molecules, organelles, cells, tissues, organs, and all the way to individuals, environmental factors, populations, and ecosystems, systems medicine aims to discover and select the key factors at each level and integrate them into models of translational relevance, which include measurable readouts and clinical predictions.

The Special Session will build on experiences as well as technological and scientific developments stemming from some flagship projects funded by the EU under the FP7 framework programme aiming to bring together researches working in the fields of infrastructures and technologies for integrative biomedical research, ICT for predictive and translational medicine and the VPH at large.

In addition the Special Session invites original research work in all aspects of Cancer Informatics with a focus on revealing progress, and challenges in some of core domains that support the vision of predictive and personalised medicine in the domain of cancer.

Organisers:

- Prof Manolis Tsiknakis, TEI Crete and FORTH
- Dr Kostas Marias, FORTH
- Dr Vangelis Sakkalis, FORTH
- Prof Norbert Graf, University of Saarland
- Dr Anca Bucur, Philips Research, Eindhoven, NL
- Dr Georgios Mitsis, University of Cyprus
- Prof Constantinos S. Pattichis, University of Cyprus

Projects:

The Special session will draw upon experiences from some flagship EU funded projects such as:

ContraCancrum (<http://www.contracancrum.eu/>)

TUMOR (<http://tumor-project.eu/>)

p-medicine (<http://www.p-medicine.eu/>)

INTEGRATE (<http://www.fp7-integrate.eu/>)

ΥΠ.ΕΡ.ΘΕ.Ν. (<http://www.yperthen.gr>)

GRANATUM (<http://www.granatum.org/>)

Linked2Safety (<http://www.linked2safety-project.eu/>)

Important Dates:

Paper Submission Deadline: July 15, 2012

Paper Notification: August 15, 2012

Camera Ready Paper: September 8, 2012

Special issues:

Extended versions of the best papers of the conference will be invited for publication in journal special issues.