# 4th International Advanced Research Workshop on In Silico Oncology and Cancer Investigation – The ContraCancrum Workshop

September 8-9, 2010
Athens, Greece
www.4th-iarwisoci.iccs.ntua.gr

Venue:
Royal Olympic Hotel
www.royalolympic.com

## Workshop Program

GENERAL INSTRUCTIONS

PLEASE NOTE that each PowerPoint® presentation of the technical program will last 15 minutes. Five additional minutes will be devoted to discussion, questions and answers.

PLEASE bring your own laptop along with a memory stick containing your presentation(s).

Short 10 minute intervals before each lunch will be devoted to informal discussion.

## Wednesday, 8 September

***9:00-9:30 Participants' arrival – Registration (no admission fee)***

**INTRODUCTORY TALKS**

**9:30-9:40** *Welcome Address*
*In Silico Oncology: A Platonic approach to medical science*
G.Stamatakos

**9:40-9:45** *Brief greetings*
K.Marias
N.Graf

**9:45-10:00** *Scientific and Technological Background of In Silico Oncology*
N.Uzunoglu

**TECHNICAL PROGRAM**

**10:00-10:20** *Tumor segmentation: The impact of standardized signal intensity histograms in glioblastoma*

J.Zepp, N.Graf, E.Skounakis, R.Bohle, E.Meese, H.Stenzhorn, Y.-J. Kim, C.Farmaki, V.Sakkalis, W.Reith, G.Stamatakos, K.Marias

**10:20-10:40** *Multiscale Clinical, Morphologic and Genomic Data Management for in Silico Oncology of NSCLC*
Y.-J.Kim, C.Veith, J.Palm, A.Grgic, R.Rixecker, C.Roggia, W.Bauer, G.Schneider, D.Tscholl, N.Graf, R.M.Bohle

**10:40-11:00** *Virtual Simulation (Preplanning) in Interventional Radiation Therapy*
N.C.Zamboglou
(Abstract)

***11:00 – 11:30 Coffee Break***

**11:30-11:50** I*n Silico Oncology: A Hypermatrix–Operator Formulation of a Top-Down Multiscale Simulation Model of Tumor Response to Treatment. The Oncosimulator Concept.*
G.Stamatakos

**11:50-12:10** *The ISOG, NTUA Tumor Response to Treatment Discrete Simulation Models: A Review of Basic Concepts and Algorithms*
D.Dionysiou

**12:10-12:30** *Breast Cancer Modeling in the Clinical Context: Parametric Studies*
E.Kolokotroni, D.Dionysiou, E.Georgiadi, N.Uzunoglu, G.Stamatakos

**12:30-12:50** *Discrete Event Based Modeling of Nephroblastoma. Sensitivity Considerations*
E.Georgiadi, D.Dionysiou, E.Kolokotroni, N.Uzunoglu, N.Graf, G.Stamatakos

***13:00 – 14:00 Lunch***

**14:00-14:20** *Tumor growth law and its physical and therapeutic implications*
C.Guiot, P.Castorina, P.Delsanto, T.Deisboeck

**14:20-14:40** *Tumor microenvironment in a real-life model of tumor spheroids*
R.Chignola, E.Milotti

**14:40-15:00** *Physical and Computational Issues in a Simulation of Multicellular Tumor Spheroids*
E.Milotti, R.Chignola

**15:00-15:20** *Application of ANOVA-Based Global Sensitivity Analysis to a Multiscale Cancer Model*
Z.Wang, T.Deisboeck

**15:20-15:40** *Computational cell based multi-scale multi-model framework for prediction of fates of cells in cancer biology*
T.Bily, V.Bednar, M.Karasek, T.Mikula

**15:40-16:00** *A Continuum Model of Mesenchymal Cell Migration and Sprouting Angiogenesis*

F.Milde, M.Bergdorf, P.Koumoutsakos

***16:00 – 16:20 Coffee Break***

**16:20-16:40** *Brain energy metabolism and implications for brain tumors: an in silico study*
S.Genç, I.Kurnaz, M. Özilgen

**16:40-17:00** *Web-Service Based Analysis of Gene-expression Data for Cancer Patients*
J.Karlsson, M.Garcia, V. Martín-Requena, O.Trelles

**SOCIAL PROGRAM**

***18:30 Peripatetic tour of the Acropolis perimeter including a visit to the Areopagus*** *http://en.wikipedia.org/wiki/Areopagus* ***, a view of the Parthenon*** *http://en.wikipedia.org/wiki/Parthenon* ***and a glimpse of the Ancient Agora of Athens*** *http://en.wikipedia.org/wiki/Ancient_Agora_of_Athens*

***20:30 Dinner at the Ioannis Restaurant , Royal Olympic Hotel*** *http://www.royalolympic.com/athens_hotel.php?ID=athens_restaurant_bars*

# Thursday, 9 September

***9:00-9:40 Participants' arrival***

**9:40-10:00** *Molecular Personalization of Cancer Treatment via a Multiscale Simulation Model of Tumor Response to Therapy. The Paradigm of Glioblastoma Treated with Temozolomide.*
A .Folarin, G.Stamatakos

**10:00-10:20** *Rapid and accurate ranking of binding affinities of epidermal growth factor receptor sequences with selected lung cancer drugs*
S.Wan and P.Coveney

**10:20-10:40** *CONTRA CANCRUM AT THE PROJECT LEVEL: Clinically Oriented Translational Cancer Multilevel Modelling*
K.Marias, V.Sakkalis, A.Roniotis, I.Karatzanis, G.Stamatakos, D.Dionysiou, S.Giatili, N.Uzunoglou, N.Graf, R.Bohle, E.Messe, H.Stenzhorn, Y.-J.Kim, P.Coveney, S.Zasada, S.Wan, A.Folarin, P.Büchler, T.Bardyn, S.Bauer, M.Reyes, G.Clapworthy, E.Liu, T.Bily, V.Bednar, M.Karasek, A.Franz, R.Grewer, and J.Sabczynski

**10:40-11:00** *CONTRA CANCRUM AT THE PROJECT LEVEL: The ContraCancrum Oncosimulator: Integrating Biomechanisms Across Scales in the Clinical Context*
G.Stamatakos, D.Dionysiou, S.Giatili, E.Kolokotroni, E.Georgiadi, A.Roniotis, V.Sakkalis, P.Coveney, S.Wan, S.Manos, S.Zasada, A.Folarin, P.Büchler, T.Bardyn, S.Bauer, M.Reyes, T.Bily, V.Bednar, M.Karasek, N.Graf, R.M.Bohle, E.Meese, Y.-J.Kim, H.Stenzhorn, G.Clapworthy, E.Liu, J.Sabczynski, K.Marias

***11:00 – 11:30 Coffee Break***

**11:30-11:50** *Approximating the diffusion – reaction equation for developing glioma models for the ContraCancrum Project: a showcase*
A. Roniotis, K.Panourgias, J.Ekaterinaris, K.Marias, V.Sakkalis

**11:50-12:10** *Glioma diffusive modeling: Calculating diffusion coefficients from atlases with proportional tissue information*
A.Roniotis, V.Sakkalis, G.Stamatakos, M.Zervakis, K.Marias

**12:10-12:30** *An Explicit Boundary Condition Treatment of a Diffusion – Based Glioblastoma Tumor Growth Model*
S.Giatili, N.Uzunoglu , G.Stamatakos

**12:30-12:50** *A Markov-Random-Field-Based Biomechanical Tumor Growth Model for Atlas-Based Segmentation of Brain Tumor Images*
S.Bauer, M.Reyes

***13:00 – 14:00 Lunch***

**14:00-14:20** *Biomechanical model of tumor growth: application to the ContraCancrum project*
C.May,T.Bardyn, M.Reyes, P.Büchler

**14:20-14:40** *Image Processing for in-silico Oncology and Lung Cancer*
A.Franz, R.Opfer, S.Renisch, R.Grewer, J.Sabczynski

**14:40-15:00** *Using the GPU for Simulating Spatiotemporal Tumour Growth*
B.Liu, G.Clapworthy, E.Kolokotroni, G.Stamatakos

**15:00-15:20** *A framework supporting sharing and reuse of data and tools in translational cancer research: Lessons learned for VPH research*
M.Tsiknakis, S.Sfakianakis, G.Zacharioudakis, L.Koumakis

**15:20-15:40** *The ACGT Oncosimulator: from Conceptualization to Development via Multiscale Cancer Modeling*
G.Stamatakos, D.Dionysiou, E.Georgiadi, E.Kolokotroni, S.Giatili, A.Hoppe, C.Desmedt, A.Lunzer, M.Erdt, J.Jacques, J.Pukacki, R.Belleman, P.Melis, A.d'Onofrio, F.Buffa, B.Claerhout, S.Rueping, K.Marias, M.Tsiknakis, N.Graf

**15:40-16:00** Validating the ACGT Oncosimulator with a
Grid-Supported Visualisation Environment
A.Lunzer, R.Belleman, P.Melis, J.Pukacki, P.Spychała, G.Stamatakos

***16:00 – 16:20 Coffee Break***

**16:20-16:40** *Markup Languages for In Silico Oncology*
D.Johnson, J.Cooper, S.McKeever

**16:40:17:00** *A collaborative system for the in silico oncology domain: Requirements, solutions and guidelines*
I.Lykourentzou, D.Dionysiou, G.Stamatakos

**17:00:17:30** *ROUND TABLE DISCUSSION – CONCLUSIONS*

## SOCIAL PROGRAM

***18:15 Optional visit to the new Acropolis Museum***
*www.theacropolismuseum.gr* *(general admission fee: 5 euros)*

***20:30 Dinner at the traditional taverna Thespis by the Acropolis***
*http://www.tripadvisor.com/Restaurant_Review-g189400-d1546616-Reviews-Taverna_Thespis-Athens_Attica.html*