International Centre for Scientific Culture "E. Majorana"

School of Mathematics "G. Stampacchia"

"MATHEMATICAL ONCOLOGY: NEW CHALLENGES FOR SYSTEMS BIOMEDICINE"

September 26-30, 2011

Program of Lectures

Monday 26 September 2011

8h30 Welcome A.d'Onofrio

Inaugural Invited Lectures Session
Chairman: A. Fasano

8h45 Nicola Bellomo *Towards a Mathematical Theory of Complex Systems: Reducing Complexity, Multiscale Aspects, and Applications*

9h45 Avner Friedman *Cancer as multifaceted disease*

10h30 Silvio Parodi *Dynamic simulations of pathways downstream of TGFbeta, Wnt and ErbB-family, in colorectal cancer, including mutations and treatments with onco-protein inhibitors*

11h15 Coffee Break

Perspective Invited Lectures Session: "Towards Personalized Medicine"
Chairman: A. Gandolfi

11h40 Zvia Agur *Mathematical Models Reveal a Mechanism of Fate Decision in Cancer Stem Cells and suggest Effective Oncotherapy Modalities*

12h25 Ferruccio Bonino *Bio-physical-mathematical modeling of infected cell and neoplastic cell dynamics under therapy as tool for treatment tailoring*

13h10 Lunch

Invited Lectures Session
Chairman: R. Barbuti

15h00 Benjamin Ribba *A tumor growth inhibition model for diffuse low-grade gliomas*

Contributed Talks Session
Chairman: R. Barbuti

15h30 Tatiana Sannikova *Homeostasis and oncogenesis: mathematical model*

16h00 Elena Fimmel *On the Mathematical Modelling and Treatment Strategies of Leukemia*

16h30 Coffee Break

Contributed Talks Session
Chairman: P. Ubezio

16h45 Frédérique Billy *Mathematical modeling of the control of proliferation in cycling cell population*

17h15 Paulo F. de Arruda Mancera *Mathematical modelling in cancer: angiogenesis dynamics and antineoplastic chemotherapy*

17h35 Elva Chen *The Noise in the Biomarker Development Pathway*

Tuesday 27 September 2011

Invited Lectures Session
Chairman N. Bellomo

8h45 Gaetano Finocchiaro *TBA*

Minisymposium on "Modeling Immunotherapies"
Organizer: A. Radunskaya
Chairman: N. Bellomo

9h30 **Invited Lecture** Ami Radunskaya *Mathematical Models of Cancer Vaccines*

10h15 Shelby Wilson *Treatment Protocols for a Mathematical Model of the Enhancement of Tumor Vaccine Efficacy by Immunotherapy*

10h45 Coffee Break

Invited Lectures Session
Chairman A. Gandolfi

11h15 Alberto d'Onofrio *Evolutionary strategies in immunoediting*

11h55 Fabio Grizzi *Immuno-oncology: what we have, what we need in the light of cancer complexity?*

12h45 Lunch

Special Event: "Fostering effective collaboration between Experimental and Theoretical Immunologists"
Chairwoman: Z. Agur

14h45 Arianna Palladini *Computational Models: novel tools for Cancer Vaccine – Part I*

15h30 Filippo Castiglione *Computational Models: novel tools for Cancer Vaccine – Part II*

16h15 Debate moderated by A. d'Onofrio

16h30 Coffee Break

Contributed Talks Session
Chairwoman: U. Ledzewicz

17h00 Marina Dolfin *Modelling Th1-Th2 cell balance during T cells mediated Immune Response*

Invited Lectures Session
Chairman: U. Ledzewicz

17h30 Roberto Barbuti The Calculus of Looping Sequences for Modelling Biological Systems

Wednesday 28 September 2011

Invited Lectures Session
Chairman: A. d'Onofrio

8h45 Antonio Fasano *On the role of ATP production in tumor spheroids*

9h30 Paolo Ubezio *Full rendering of the proliferation process at the cell population level during the response to anticancer treatments*

10h15 Attila Csikasz-Nagy *Dynamic networks of cooperators and defectors - implications to cancer?*

11h Coffee Break

Perspective Invited Lectures Session: "New approaches in Antitumor Drugs Modelling"
Chairman: P. Ubezio

11h30 Prahlad T. Ram, *Systems based approach to understand and target networks in cancer*

12h15 Kevin Hicks *Introducing drug transport early in the design of hypoxia selective anticancer agents using a mathematical modelling approach*

13h00 Lunch

Minisymposium on "Systems Biology of cellular proliferation".
Organizer: Attila Csikasz-Nagy
Chairman: J. Ignacio Tello

15h00 Attila Csikasz-Nagy *Feedback and feed-forward controls of cell cycle transitions*

15h30 Laurence Calzone *Mathematical modelling of cell-fate decision networks*

16h00 Ivan Mura *Modeling signaling transduction mediated by the tyrosine-kinase receptors*

16h30 Coffee Break

Contributed Talks Session
Chairwoman: U. Ledzewicz

16h45 Annalisa Barla *Parameter Space Exploration within dynamic simulations of a signaling-network downstream of TGF-β, Wnt and EGF-family growth factors, with reference to colorectal cancer*

17h15 Rimantas Edukevicius *Bayesian methods applied to cell cycle inferences*

17h45 Diego Luis Gonzalez *A new mathematical theory of the genetic code: a fresh look at the organization of genetic information*

Thursday 29 September 2011

Invited Lectures Session
Chairman: Prahlad T. Ram

8h45 Annabelle Ballesta *A Combined Experimental and Mathematical Approach for Molecular-based Personalization of Irinotecan Circadian Delivery*

9h30 Dirk Fey *Understanding TrkA and Myc dysregulation in neuroblastoma using dynamic modelling approaches*

10h15 Alfonso Iudice *Modelling epilepsy dynamics and seizure prediction in human brain tumors*

11h Coffee Break

Perspective Invited Lectures Session: "Systems Biomedicine of Cancer Stem Cells"
Chairman: A. Gandolfi

11h30 Vincenzo Capasso *Mathematical Modelling of Cancer Stem Cells Population Behavior*

12h15 Heiko Enderling *Cell-cell interactions in solid tumors - the role of cancer stem cells*

13h00 Lunch

Friday 30 September 2011

Perspective Invited Lectures Session: "Individual Based and Multiscale Tumor Modelling: the state of the art"
Chairman: V. Capasso

8h45 Dirk Drasdo *Quantitative modeling of tumor growth and regeneration on the histological scale*

9h30 Luigi Preziosi *A multiphase and multiscale overview of cancer modeling*

10h15 Holger Perfahl *Multiscale modeling of vascular tumor growth and therapy*

11h Coffee Break

Invited Lectures Session
Chairman: A. d'Onofrio

11h30 Urszula Ledzewicz *Design of optimal protocols for combination therapies in cancer*

Contributed Talks Session
Chairman: A. d'Onofrio

12h15 Naïma Aissa *Analysis of a Mathematical Model of Morphogenesis of Vascular Networks*

13h00 Lunch

Minisymposium on "Mathematical Models of Chemotaxis and Tumour growth".
Organizer: J. Ignacio Tello
Chairman: Attila Csikasz-Nagy

15h00 **Invited Lecture** J. Ignacio Tello *Stability of solutions for chemotaxis systems*

15h45 Dariusz WRZOSEK *Mathematical Modelling of Cancer Invasion: the importance of cell-cell adhesion and cell-matrix adhesion*

16h15 Marek Bodnar *New approach to modeling of antiangiogenic treatment on the basis of Hahnfeldt et al. model*

16h45 Cristian Morales-Rodrigo *Modelling and mathematical analysis of various anti-angiogenic therapies*

17h15 Coffee Break

17h45 Debate: "New Challenges for Systems Biomedicine"