Workshop on Understanding Complexity in Life Sciences

Promoters: Marta Bertolaso (University of Campus Bio-Medico, Roma, Italy), Silvia Caianiello (ISPF, CNR, Napoli, Italy), Lilia Alberghina (SYSBIO/ISBE.IT – Centre of Systems Biology, University of Milano-Bicocca, Milano, Italy)

Organizational coordinator: Andrea Pensotti (University Campus Bio-Medico, Roma, Italy)

Location: University of Milano Bicocca - Room U4-08 "Luisella Sironi", Building U4, Piazza della Scienza 4, Milano.

Date: Milan, February 2019, Thursday 14th (9:00-19:00) – Friday 15th (9:00-13:30)

Conference aims and scope

High Throughput Technologies and computational sciences are more and more present in biological research. This model, which is both sustained by scientific results and by industrial interests, is leading science towards a crossroad: will life sciences succeed in understanding complex biological functions by using only technology, Big Data and artificial intelligence? Or do we need to develop new theoretical frameworks and mathematical models to drive experiments and data interpretation? Or, more likely, do we have to integrate the two approaches?

This workshop aims to draw the main scenarios we are facing and analyse the concrete case of the Organ-on-Chip model.

Organ on Chip model

The need for a more effective biological experimental setup to study inter-level regulatory processes is pushing both biomedical sciences and technology toward new goals. In particular, the merging of cell biology, micro fabrication techniques and microfluidics has fostered the development of organoids and organ-on-chip (OoC) technologies, which recapitulate the tissue-tissue interfaces to build the key functional units of single organs and even bodies-on-a-chip functionalities, that is the functional interactions among different organs. Endowed with multiple sensing and actuating devices, OoC technology allows, in fact, both the high-throughput real-time measurement of multiple crucial parameters, independently one from the other, and the mimicking of the physiological and pathological dynamics of the organ or organ system.

These technologies also allow to better analyse metabolic and regulatory circuits, overcoming traditional limits of one or two-dimensional analysis. They finally open new scenarios for personalized medicine and drug discovery. This breakthrough will be particularly effective for cancer, autoimmune and neurodegenerative diseases research.

How can we assess the reliability and promises of this new technology and its power of understanding of biological laws in a complex and uncertain scenario?

Impact

This workshop will help scientists, medical doctors, investors and policy makers to assess the effectiveness of this new research approach, which are needed in order to rationalise investments in human resources and funding. This event will be equally useful for professional people involved in communication and dissemination processes of the new technological advancement in biomedical research.

Nowadays we are witnessing huge investments in research (Human Genome Project is just an example), but also we have to face disappointing results: the "war on cancer" is still not won after many decades and the research on neurodegenerative diseases in still in the dark. In this scenario the promise of computational sciences represent a clear light, but before betting all our efforts on this path in terms of Big Data and Artificial Intelligence it is wiser recalling the basic aims of science: deductive and inductive approaches, experimental guidance and search for basic laws which govern each process.

Call for participation

The organisation will dedicate an entire session to short talks.
Abstract submission deadline: January 20th 2019
Please submit your abstract to this address: info@saluteuropa.org
Each abstract should report name, affiliation, email, title and no more than 200 words.

The organisation will select the abstracts for short talks.
The others will be presented as posters

Registration

Registration fee: 80 euros
On site registration will be allowed but authors submitting abstracts have to report before January 20th 2019

Preliminary Program

February 14th., 2019
Session 1 9:00-10:15
Biological complexity: Setting the stage

9:00 - 9:15
Welcome Addresses
Prof. Cristina Messa (Rector of the University of Milano-Bicocca IT)

9:15 - 9:45
Marta Bertolaso (Professor of Philosophy of Science, Campus Bio-Medico, University of Rome, IT),

9:45 - 10:15
Silvio Garattini (President of Mario Negri Institute, Milan, IT)

10:15 - 10:45
Coffee break

Session 2 10:45 - 12:45
Approaching complexity in science

10:45 - 11:15
Enzo Marinari (Professor of Theoretical Physics, Sapienza University, Rome, IT)

11:15 - 11:45
Jasmin Fisher (not confirmed - Principal researcher at Microsoft's Cambridge Research Lab, UK)

11:45 - 12:15
From Computational Genomics to Systems Metabolomics to understand Biological Complexity
Lilia **Alberghina** (Director of SYSBIO Center of Systems biology - University of Milan-Bicocca, Milano, IT)

12:15 - 12:45
General discussion

12:45 - 14:00
Lunch break

Session 3 14:00 - 16:00
Understanding complex biological processes

14:00 - 14:30
Iain Mattaj (former director of EMBL, Heidelberg, DE, newly appointed director of the Human Tecnopole, Milan, IT)

14:30 - 15:00
Hans V. Westerhoff (Director of Manchester Center for Integrative Systems Biology, UK and professor of Systems Biology, Free University of Amsterdam, NL)

15:00 - 15:30
Marco Vanoni (Professor of Biochemistry, Dept of Biotechnology and Biosciences, University Milan-Bicocca, Milano, IT)

15:30 - 16:00
General discussion

16:00 - 16:15
Coffee break

Session 4 16:15 - 18:00
Short talks

16:15 - 18:00
Short talk seminar

18:00 - 18:30
Concluding remarks

February 15th

Session 5 9:00 - 11:30
Organ-on-Chip: a new approach to biological complexity

9:00 - 9:30
Silvia Caianiello (Senior researcher at CNR - ISPF, Napoli, IT)

9:30 - 10:00
John Wikswo (Director of Vanderbilt Institute for Integrative Biosystems Research and Education, Nashville, USA)

10:00 - 10:20
Matteo Moretti (Head of Cell and Tissue Engineering Lab, IRCCS Galeazzi, Milan, IT)

10:20 - 10:40
Luca Businaro (Senior researcher at CNR - IFN, Rome, IT)

10:40 - 11:00
Alberto Rainer (Professor of Industrial Bioengineering, Campus Bio-Medico University, Rome, IT)

11:00 - 11:30
Polona Tratnik (Senior researcher at Alma Mater Europaea Institutum Studiorum Humanitatis, Ljubljana, SLO)

11:30 - 11:50
Coffee break

Session 6 11:50 - 13:40
How to bring new research findings to society

11:50 - 12:20
Adrian Roth (Head Mechanistic Safety, Pharmaceutical Sciences, Roche, Basel, CH)

12:20 - 12:50
Gianluca Oricchio (CEO Muzinich&Co, USA)

12:50 - 13:20
Claudio Giuliano (CEO Innogestcapital Italy)

13:20 - 13:40
Concluding remarks