

▶ 16:30 - 17:00
Claudio Giuliano (CEO Innogestcapital, IT)

▶ 17:00 - 17:30
Gianluca Oricchio (CEO Springrowth SGR, USA)

▶ 17:30 - 18:30 **General discussion and concluding remarks**

February 15th 2019

Morning session

Chairperson: **Hans V. Westerhoff**

Session 5 9:00 - 14:15

Organ-on-Chip: a new approach to biological complexity

▶ 9:00 - 9:30 **Complexity, microphysiological systems, and closing the hermeneutic circle of biology**
John Wiksw (Director of Vanderbilt Institute for Integrative Biosystems Research and Education, Nashville, USA)

▶ 9:30 - 10:00 **Thinking in three-dimensions – a new paradigm for modelling complexity?**
Silvia Caianiello (Senior researcher at CNR - ISPF, Stazione Zoologica Anton Dohrn, Naples, IT)

▶ 10:00 - 10:20 **Embedding complexity within 3D human in vitro models: investigating microenvironmental interactions in the metastatic process**
Matteo Moretti (Director of Regenerative Medicine Technologies Lab, Ente Ospedaliero Cantonale, Lugano, CH)

▶ 10:20 - 10:40 **Immune system on chip models for onco-immunology and drug testing applications**
Luca Businaro (Senior researcher at CNR - IFN, Rome, IT)

11:00 - 11:20 Coffee break

▶ 11:00 - 11:20
Alberto Rainer (Professor of Industrial Bioengineering, Campus Bio-Medico University, Rome, IT)

▶ 11:20 - 11:35
Dr Dharaminder Singh (Senior Bioengineer at CN Bio)

▶ 11:35 - 11:50 **Talk 1**

▶ 11:50 - 12:05 **Talk 2**

▶ 12:05 - 12:20 **Talk 3**

▶ 12:20 - 12:35 **Talk 4**

▶ 12:35 - 13:05 **Human Science and Engineering – Between Discovering and Designing Bodies**
Polona Tratnik (Senior researcher at Alma Mater Europaea Institutum Studiorum Humanitatis, Ljubljana, SLO)

▶ 13:05 - 13:20 **General discussion**

▶ 13:20 - 13:35 **Concluding remarks**
Marta Bertolaso and Lilia Alberghina

Workshop on Understanding Complexity in Life Sciences

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

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

PROMOTERS

Marta Bertolaso (FAST - Campus Bio-Medico University, Rome, IT)

Silvia Caianiello (ISPF, CNR, Stazione Zoologica Anton Dohrn, Naples, IT)

Lilia Alberghina (SYSBIO/ISBE.IT – Centre of Systems Biology, University of Milano-Bicocca, Milan, IT)

ORGANIZATIONAL COORDINATOR

Andrea Pensotti (FAST - Campus Bio-Medico University, Rome, IT)

UNDER THE PATRONAGE OF



Accademia
dei Lincei



Accademia
dei XL

Scientific Committee:

Simonetta Filippi
Giuseppe Macino
Stefano Piccolo

Partners



Sponsor



Media Partner



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, nanotechnology and microengineering techniques has fostered the development of advanced 3D in vitro models such as organoids and organ-on-chip for recapitulating in vitro the physiological and pathological dynamics of tissues and organs, and even functional interactions among different organs (bodies-on-chip).

These technologies will 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.

How can we assess the reliability and promises of these new technologies and their potential contribution in the understanding of biological phenomena in this complex scenario?

Impact

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

Preliminary Program

February 14th 2019

Morning session

Chairperson: **G. Piccialli**

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 **The hidden simplicity in biological complexity**
Marta Bertolaso (Professor of Philosophy of Science, FAST - Campus Bio-Medico, University of Rome, IT)
- ▶ 9:45 - 10:15 **How pharmacological research has evolved**
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 **The physics of complexity and the biological world**
Enzo Marinari (Professor of Theoretical Physics, Sapienza University, Rome, IT)
- ▶ 11:15 - 11:45 **Laplace's daemon killed by a butterfly wing in Babel's garden: reasoning at the intersection of Health and Technology**
Robert Alexander (Director IBM Health division, Rome IT)

- ▶ 11:45 - 12:15 **Introducing the Human Technopole**
Iain Mattaj (former director of EMBL, Heidelberg, DE, newly appointed director of the Human Tecnopole, Milan, IT)

- ▶ 12:15 - 12:45 **General discussion**

12:45 - 14:00 **Lunch break**

Afternoon session

Chairperson: **M. Bertolaso**

Session 3 14:00 - 15:30

Understanding complex biological processes

- ▶ 14:00 - 14:30 **From Computational Genomics to Systems Metabolomics to understand Biological Complexity**
Lilia Alberghina (Director of SYSBIO Center of Systems biology - University of Milan-Bicocca, Milan, IT)
- ▶ 14:30 - 15:00 **Metabolic rewiring in nutritionally perturbed and drug-resistant cancer cells**
Marco Vanoni (Professor of Biochemistry, Dept of Biotechnology and Biosciences, University Milan-Bicocca, Milan, IT)
- ▶ 15:00 - 15:30 **System Biology and Human Society**
Hans V. Westerhoff (Director of Manchester Center for Integrative Systems Biology, UK and professor of Systems Biology, Free University of Amsterdam, NL)

15:30 - 16:00 **Coffee break**

Session 4 16:00 - 18:30

How to bring new research findings to society

- ▶ 16:00 - 16:30
Adrian Roth (Head Mechanistic Safety, Pharmaceutical Sciences, Roche, Basel, CH)