

Joint ICGEB-ICTP-APCTP Workshop on Systems Biology and Molecular Economy of Microbial Communities



3 - 7 July 2017
Trieste, Italy

Further information:

Activity URL: <http://indico.ictp.it/event/7973/>

E-mail: smr3129@ictp.it

The Workshop aims at bringing together researchers from different fields, spanning different types of microbial communities, cell-to-cell signalling and quorum sensing, systems and synthetic biology and metagenomics, in order to explore the emerging unifying concepts in how communities self-organize.

Description:

Every living cell needs to solve a complex resource allocation problem. Most microbial cells typically address this task within a spatially structured, variable environment, where a myriad of different cells are concurrently allocating their own resources. Likewise, the distribution and exchange (i.e. the “economy”) of molecules in the microbial world shape the interactions, diversity and dynamics of microbial communities, and determine their impact on human life, either from a biomedical or from an environmental sustainability perspective. The key element in addressing these questions is their multiscale nature: mutations and regulation happen at the level of individual genes; metabolic processes involve the balance of cell-scale pathways; biomedically relevant phenotypes depend on the interactions among multiple cells in heterogeneous environments. Participants will compare different methodologies to better integrate quantitative approaches and data gathering efforts, including the creative use of new mathematical tools, high performance computing algorithms and new ways of integrating experimental measurements and computational models.

Topics:

- Ecological and evolutionary dynamics;
- Ecological models of microbial communities;
- Population and evolutionary dynamics;
- Game theoretic approaches to cooperation, cross-feeding and competition
- Spatio-temporal dynamics of microbial consortia;
- Synthetic biology and synthetic ecology;
- General Equilibrium Economics of metabolic production in microbial communities;
- Stoichiometric models of metabolism, from genomes to ecosystems;
- Cell-to-cell signaling and quorum sensing;
- Metagenomic and metatranscriptomic methods for communities;
- Host-microbe interaction / Microbe-host interaction (e.g. antibiotic resistance);
- Human microbiome, systemic stability and disease;
- Plant resistance;
- Human microbiome, systemic stability and disease;
- Plant microbiome, parasites and diseases.

Directors:

D. SEGRÈ, BOSTON UNIVERSITY
S. A. LEVIN, PRINCETON UNIVERSITY
V. VENTURI, ICGEB
P.-J. KIM, KAIST
M. MARSILI, ICTP

Local Organizer:

M. MARSILI, ICTP

Speakers include:

B. BERGHUIS, Stanford University
J. CREMER, UCSD
J. GORE, MIT
P. GREENBERG, University of Washington
W. HARCOTBE, University Minnesota St. Paul
I. HWANG, Seoul National University
R. KISHONY, Technion
K. KOROLEV, Boston University
L. LEONI, Università degli Studi Roma Tre
B. LEVIN, Emory University
I. MANDIC MULEC, University of Ljubljana
C. MARX, University of Idaho
P. MEHTA, Boston University
C. NADELL, MPI for Terrestrial Microbiology
H. B. NIELSEN, Technical University of Denmark
R. PARTHASARATHY, University of Oregon
K.L. PATIL, EMBL
A. SANCHEZ, Yale University
M. SCHUSTER, Oregon State University
W. SHOU, University of Washington
O. SOYER, University of Warwick
C. TARNITA, Princeton University
K. VETSIGIAN, University of Wisconsin-Madison
L. ZHAO, Shanghai Jiao Tong University

How to apply:

Online application:

<http://indico.ictp.it/event/7973/>

Female scientists are encouraged to apply

Grants:

Some grants are available to support the attendance of selected participants, especially those from developing countries, ICGEB member states, and those from the Asia Pacific region who are at the early stages of their career. See workshop web page for details. There is no registration fee.

Deadline:

31 March 2017



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www.ictp.it

Strada Costiera 11, 34151 Trieste, Italy Tel. +39 0402240111

