HETEROGENEITY AND EVOLUTION IN CANCER
23 - 24 - 25 September 2019

Venue:

Spanish National Cancer Research Centre – CNIO Auditorium, Madrid, Spain

Chairpersons and organizing committee:

Fátima Al-Shahrour, Spanish National Cancer Research Centre, CNIO, Spain
Arnold Levine, The Simons Center for Systems Biology, Institute for Advanced Study, US
Solip Park, Spanish National Cancer Research Centre, CNIO, Spain
Raúl Rabadán, Columbia Systems Biology, Columbia University, US

Rationale:

Cancers are dynamical and heterogeneous biological processes. Heterogeneity and evolution are the main factors driving oncogenesis, growth, invasion and failure of therapy. Longitudinal, multi-sampling and single cell genomic and transcriptomic characterization of tumors allows to reconstruct their changes and to link them to clinically relevant phenotypes. This workshop will bring together a community of interdisciplinary researchers developing tools to study these processes and applying them to large numbers of tumors.

Confirmed Speakers

Alexander R. A. Anderson, Moffitt Cancer Center and Research Institute, Tampa, US
Niko Beerenwinkel, ETH Zürich, Switzerland
Ivana Bozic, University of Washington, Washington, US
Curtis G. Callan, Physics Department, Princeton University, US
Neal G. Copeland, University of Texas MD Anderson Cancer Center, US
Christina Curtis, Stanford University, School of Medicine, Stanford, US
Adolfo Ferrando, Institute for Cancer Genetics, Columbia University, New York, US
Trevor Graham, Barts Cancer Institute, London, UK
Benjamin D. Greenbaum, Icahn School of Medicine at Mount Sinai, New York, US
Holger Heyn, National Centre for Genomic Analysis, Barcelona, Spain
Nancy Jenkins, University of Texas MD Anderson Cancer Center, US
Tal Korem, Columbia University Irving Medical Center, New York, US
Christina Leslie, Memorial Sloan Kettering Cancer Center, New York, US
Arnold Levine, The Simons Center for Systems Biology, Institute for Advanced Study, US
Nuria Lopez-Bigas, Institute for Research in Biomedicine, Barcelona, Spain
Scott W. Lowe, Memorial Sloan Kettering Cancer Center, New York, US
Guillermina Lozano, University of Texas Anderson Cancer Center, US
Marta Łuksza, Institute for Advanced Study, Princeton, US
David Posada, School of Biology, University of Vigo, Spain
Carol Prives, Columbia University, New York, US
Benjamin J. Raphael, Lewis-Sigler Institute for Integrative Genomics, Princeton University, US
Darryl Shibata, Keck School of Medicine of USC, Los Angeles, US
Andrea Sottoriva, The Institute of Cancer Research, London, UK
Doug Winton, Cancer Research UK Cambridge Institute, Cambridge, UK

23rd September 2019 - Monday

09:00 Registration

09:30-09:45 Opening Remarks (*Fátima Al-Shahrour and Raul Rabadan*)

09:45-12:45 Session#1
Chairperson: tbc

09:45-10:15 The Roles of Initiating Truncal Mutations in Human Cancers: The Order of Mutations and the Tumor Cell Type Matters
Arnold Levine, The Simons Center for Systems Biology, Institute for Advanced Study, US

10:15-10:45 Rapid evolution and biogeographic spread in a colorectal cancer
David Posada, School of Biology, University of Vigo, Spain

10:45-11:15 Group Picture & Coffee break

11:15-11:45 **Holger Heyn,** National Centre for Genomic Analysis (CNAG-CRG), Barcelona, Spain

11:45-12:00 *Short Talk*
12:00-12:15 *Short Talk*

12:15-12:45 Learning tumor phylogenies from single-cell data
Niko Beerenwinkel, ETH Zürich, Switzerland

12:45-14:15 Lunch break (cafeteria)

14:15-16:45 Session#2
Chairperson: tbc

14:15-14:45 Harnessing Transposon Mutagenesis to Study Tumor Evolution and Tumor Heterogeneity
Neal G. Copeland, University of Texas MD Anderson Cancer Center, US

14:45-15:00 *Short Talk*
15:00-15:15 *Short Talk*

15:15-15:45 Transposon Mutagenesis Identifies Genes and Evolutionary Forces Driving Gastrointestinal Tract Tumor progression
Nancy Jenkins, University of Texas MD Anderson Cancer Center, US

15:45-16:15 Coffee break

15:45-16:15 tbc

16:15-16:45 **Scott W. Lowe**, Memorial Sloan Kettering Cancer Center, New York, US

16:45-17:30 Poster Session & Wine and cheese

Talks: 20' + 10' Q&A
Short talks: 10' + 5'Q&A

24th September 2019 - Tuesday

09:00-11:15 Session#3
Chairperson: tbc

09:00-10:00 The statistical ensemble approach to adaptive immunity
Curtis Callan, Physics Department, Princeton University, US

09:30-10:00 **Guillermina Lozano**, University of Texas Anderson Cancer Center, US

10:00-10:15 *Short Talk*

10:15-10:45 **Benjamin J. Raphael**, Lewis-Sigler Institute for Integrative Genomics, US

10:45-11:15 Towards quantifying and forecasting tumor evolution
Christina Curtis, Stanford University, School of Medicine, Stanford, US

11:15-11:45 coffee break

11:45-13:30 Session#4
Chairperson: tbc

11:15-11:45 Age related mutational burden in human colonic epithelium is dictated by stem cell renewal processes
Doug Winton, Cancer Research UK Cambridge Institute, Cambridge, UK

11:45-12:15 Tumor genomes shed light into somatic mutational processes and cancer vulnerabilities
Nuria Lopez-Bigas, Institute for Research in Biomedicine, Barcelona, Spain

12:15-12:30 *Short Talk*

12:30-13:00 Clonal evolution mechanisms in leukemia initiation and relapse
Adolfo Ferrando, Institute for Cancer Genetics, Columbia University, NY, US

13:00-13:30 Measurement of selective coefficients for subclonal mutations in human cancer
Trevor Graham, Barts Cancer Institute, London, UK

13:30-15:00 Lunch break (cafeteria)

15:00-17:30 Session#5
Chairperson: tbc

15:00-15:30 **Carol Prives**, Columbia University, New York, US

15:30-16:00 Organizing Spatial And Temporal Intratumoral Heterogeneity
On Microscopic Tissue Sections
Darryl Shibata, Keck School of Medicine of USC, Los Angeles, US

16:00-16:15 *Short Talk*
16:15-16:30 *Short Talk*

16:30-17:00 Measurement of selective coefficients for subclonal mutations in human cancer
Benjamin D. Greenbaum, Icahn School of Medicine at Mount Sinai, New York, US

17:00-18:00 Posters Session & snacks

Talks: 20' + 10' Q&A
Short talks: 10' + 5'Q&A

25th September 2019 Wednesday

09:30-12:30 Session#6
Chairperson: tbc

09:30-10:00 Exploiting evolutionary steering to control drug resistance in cancer
Andrea Sottoriva, The Institute of Cancer Research, London, UK

10:00-10:30 Immune interactions predict cancer evolution
Marta Łuksza, Institute for Advanced Study, Princeton, US

10:30-10:15 *Short Talk*
10:15-10:30 *Short Talk*

10:15-10:30 Epigenetic rewiring and tumor plasticity
Christina Leslie, Memorial Sloan Kettering Cancer Center, New York, US

11:00-11:30 Coffee break
Certificate of Attendance and invoice will be available at the reception desk

11:30-12:00 Mathematical modeling of cancer heterogeneity
Ivana Bozic, University of Washington, Washington, US

12:00-12:30 Evolutionary therapy for metastatic cancer
Alexander R. A. Anderson, Moffitt Cancer Center & Research Institute, Tampa, US

12:30-13:00 Inferring microbial activity from metagenomic data
Tal Korem, Columbia University Irving Medical Center, New York, US

13:00 closing remarks, short talks & poster Awards

Talks: 20' + 10' Q&A
Short talks: 10' + 5'Q&A