Evolution and Ecology of Cancer
17-19 July 2019

Wellcome Genome Campus, Hinxton, Cambridge, UK

Conference Programme

Wednesday 17 July

12:00-13:20 **Registration**

13:20-13:30 **Welcome and Introductions**
Programme Committee

13:30-14:30 **Keynote Lecture:**
To the fields of Evolution and Ecology: My patients thank you for making me a better doctor – and scientist
Ken Pienta
Johns Hopkins University, USA

14:30-15:45 **Session 1: Cooperation and conflict in multicellularity**
Chair: Carlo Maley

14:30 What protists can tell us about multicellularity, cell death, and the origins of animals
Michelle Leger
Instituto de Biología Evolutiva, Spain

15:00 Systematic learning from tumour genomes enables the identification of cancer genes and driver mutations
Ferran Muinos
Institute for Research in Biomedicine (IRB Barcelona), Spain

15:15 Cooperation is costly, but so is cheating: Implications for the evolution of multicellularity and cancer
Aurora Nedelcu
University of New Brunswick, Canada

15:30 Enhanced DNA damage response in species with low cancer prevalence rates
Lisa Abegglen
Huntsman Cancer Institute, USA

15:45-16:15 **Afternoon Tea**

16:15-17:45 **Session 2: Cellular competition**
Chair: Athena Aktipis

16:15 Cell competition: a mechanism of cell selection in animal tissues
Ginés Morata
Centre for Molecular Biology, Spain

16:45 TBC
Kairbaan Hodivala-Dilke
Barts Cancer Institute, UK

17:15 The evolutionary processes shaping the neoantigen landscape during tumour growth
Eszter Lakatos
Queen Mary University of London, UK

17:30 An evolutionary understanding for how aging determines cancer incidence
James DeGregori
University of Colorado School of Medicine, USA

17:45-18:00 **Lightning talks**

18:00-19:30 **Poster Session 1 (odd numbers) with drinks reception**

19:30 **Dinner**

Thursday 18 July

09:00-10:30 **Session 3: Math models of cooperation and competition in cancer**
Chair: Trevor Graham

09:00 What can microbial colonies teach us about spatial intra-tumor heterogeneity?
Diana Fusco
University of Cambridge, UK

09.30 Cancer therapy: Changing the game
Katerina Stankova
Maastricht University, The Netherlands

10.00 Tissue hierarchies in plants can efficiently minimize somatic evolution and act as a functional germline
Mate Kiss
Eötvös Loránd University Hungary

10.15 Two layers of chance associated with spatially expanding populations: How environmental heterogeneity and demographic noise shape genetic diversity
Wolfram Moebius
University of Exeter, UK

10:30-11:00 **Morning Coffee**

11:00-12:30 **Session 4: Cooperation and Cancer**
Chair: Elizabeth Murchison

11:00 Breast cancer metastasis driven by clonal cooperation and immune microenvironment interactions
Michalina Janiszewska
The Scripps Research Institute, USA

11:30 Personalized adaptive therapies for metastatic melanoma
Alexander Anderson
Moffitt Cancer Center, USA

11:45 Comparison of somatic mutational processes across mammalian species
Alex Cagan
Wellcome Sanger Institute, UK

12:00 Deep learning the immune microenvironment complexity shaping lung cancer evolution
Khalid AbdulJabbar
The Institute of Cancer Research, UK

12:15 Cancer cell optimal foraging: motile foragers are the actuators of metastasis
Sarah Amend
Johns Hopkins University, USA

12:30-14:00 **Lunch**

14:00-15:00 **Keynote Lecture:**
Cancer Transmission in Humans
Mel Greaves
The Institute of Cancer Research, London, UK

15:00-15:45 **Session 5: Evolvability and adaption**
Chair: Carlo Maley

15:00 Evolution of Intracellular Error Rates and the Origins of Cancer
Michael Lynch
Arizona State University, USA

15:30 Speeding up evolution: exploiting contingencies on clinically relevant timescales
Jacob Scott
Cleveland Clinic, USA

15:45-16:15 Afternoon Tea

16:15-17:00 **Session 5 continued: Evolvability and adaption**
Chair: Athena Aktipis

16:15 Clonal evolution and stabilizing selection in colon adenomas and carcinomas
William Cross
Barts Cancer Institute, UK

16:30 The mutational landscape of normal endometrial epithelium
Luiza Moore
Wellcome Sanger Institute, UK

16:45 Quantification of intra-tumor spatial heterogeneity in lung adenocarcinomas
Robert J Downey
Memorial Sloan Kettering, UK

17:00-17:30 **Lightning talks**

17:30-19:00 **Poster Session 2 (even numbers) with drinks reception**

19:00 **Conference Dinner**

Friday 19 July

09:00-10:00 **Keynote Lecture:**
Transmissible cancers and the evolution of cellular cheating:
How multicellularity evolved to protect cellular cooperation and limit invasion
Athena Aktipis
Arizona State University, USA

10:00-10:30 Morning Coffee

10:30-12:00 **Session 6: Transmissible cancer**
Chair: Trevor Graham

10:30 Contagious cancer in clams! Genetics and evolution of bivalve transmissible neoplasias and their hosts
Michael Metzger
Pacific Northwest Research Institute, USA

11:00 Somatic cell parasitism: contagious cancer cell lines as ultimate parasites
Beata Ujvari
Deakin University, Australia

11:30 The evolutionary history of a transmissible cancer
Adrian Baez Ortega
University of Cambridge, UK

11:45 Scuba Cancers: Finding the genetic causes of contagious metastases under the sea
Alicia L. Bruzos
Universidade de Santiago de Compostela, Spain

12:00-13:00 Lunch

13:00-12:15 **Session 6 continued: Transmissible cancer**
Chair: Elizabeth Murchison

13:00 Cancer, behaviour, sex and transmission: infection status and tumour load affect contact rates, mating interactions and social network structure in wild Tasmanian devils
Rodrigo Hamede
University of Tasmania, Australia

13:30 Origins and evolution of transmissible cancers
Elizabeth Murchison
University of Cambridge, UK

14:00 The evolutionary dynamics of somatic retrotransposition in a millennial cancer lineage
Martín Santamarina García
Universidade de Santiago de Compostela, Spain

14:15 Genotype typing of transmissible cancers in the Mytilus edulis complex of species
Maurine Hammel
Université Montpellier, France

14:30 Closing remarks

14:45 **Coaches depart to Cambridge City Centre and Train Station, Stansted Airport via Heathrow Airport**