H2020 MSCA - ITN - 2017 - 766030

CONTRA

Computational Oncology Training Alliance

ESR 5 - Evolutionary history of circulating tumour cells and distant metastases

Research project	Metastases occur when cancer cells spread from their primary tumour of origin to distant organs, where they initiate new tumours. Metastases are believed to directly cause 90% of cancer deaths. We would like to understand the evolutionary process of metastasis formation, from the growth of the primary tumour, through the spread of circulating tumour cells (CTCs) to the growth metastatic colonies. We will develop computational and mathematical tools to model the possible evolutionary scenarios of metastasis formation, including spreading in the form of CTCs clusters, polyclonal and cross seeding. The models will be confronted with tumour, CTC, and metastasis sequencing, as well as metastasis prevalence data.
Supervisor	name Ewa Szczurek e-mail szczurek@mimuw.edu.pl website http://www.mimuw.edu.pl/~szczurek/
Host institution	University of Warsaw, Poland Faculty of Mathematics, Informatics and Mechanics
PhD program	Faculty of Mathematics, Informatics and Mechanics; Institute of Informatics
Expected results	1) New mathematical models of metastasis formation 2) New phylogenetic models of CTCs and metastases 3) Insights into the biology of metastatic seeding
Planned secondments	1) ETHZ/Beerenwinkel to learn mathematical models and integrate with CTC data (3 months) 2) UVIGO/Posada to learn evolutionary biology (2 months) 3) UCAM/Markowetz to learn analysis of sequencing data and integrate spatial aspects (2 months)
Required profile	Solid background in statistics, data analysis, mathematical modeling, excellence and experience in programming, fluent English, interest in molecular biology and cancer evolution