Contribution ID: **11** Type: **not specified**

The Pan-Cancer analysis of Whole Genomes - Towards Cloud Solutions for Life Sciences

Tuesday, 9 May 2017 12:20 (40 minutes)

Abstract

The Pan-Cancer analysis of Whole Genomes (PCAWG) project of the International Cancer Genome Consortium (ICGC) and The Cancer Genome Atlas (TCGA) is an international forerunner in meeting challenges related to the secure large-scale processing, collaborative sharing and storage of human patient genome data on clouds. In 2017, Pan-Cancer Analysis became a Scientific Demonstrator project of the newly established European Open Science Cloud (EOSC) Pilot Initiative. For this, we have recently developed an innovative and inter-operable software framework, called Butler, which enables us to jointly pursue processing of large genomic datasets and complex workflows on the cloud irrespective of where the data are generated or processed. I will provide an update on the opportunities and technical challenges for big data analytics in genomics, and our efforts to reconstruct patterns of structural variation through analysis of DNA sequencing data of approximately a Petabyte in size.

Short biography

Jan Korbel is a Group Leader and Senior Scientist at the European Molecular Biology Laboratory (EMBL). Holding a PhD in Molecular Biology, he performed his Postdoc at Yale University where he developed the paired-end mapping methodology for characterizing structural variations in next-generation sequencing. With expertise in Human Genetics and Computational Biology, Jan is particularly interested in understanding determinants of genomic DNA rearrangement formation and selection, for example in the context of enhancer hijacking or catastrophic DNA alterations (chromothripsis). Jan has a leading role in the 1000 Genomes Project and the ICGC / TCGA Pan-Cancer Analysis of Whole Genomes Initiative. Furthermore, he is significantly involved in a project dealing with scientific self-regulation in the context of whole genome sequencing in patients and associated bioethical and normative aspects. Jan Korbel was elected into the German National Academy of Sciences Leopoldina in 2015 and to the EMBO in 2016.

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Session Classification: EGI Conference Opening Plenary: Towards the European Open Science Cloud