



## IPC PLATFORMS

iPC's approach is to combine many different modelling techniques, including artificial intelligence, mechanistic and probabilistic models, statistical and multi-omics models, to make the best use of the information available for each tumour type and patient. Perhaps the greatest challenge in developing predictive models for paediatric tumours is the wide variety of data sources generated by a variety of omics platforms and technologies, and by an even wider variety of scientific fields. iPC aims to address these challenges by implementing cloud-based platforms

**The iPC Central Computational and Data Platform** is a data management system - comparable to a catalogue - combined with an analysis platform (openVRE). The iPC platform aims to establish an integrated computational environment for data sharing and analysis to enable paediatric cancer research. It was co-developed by the two partners BSC (Barcelona Supercomputing Center) and XLAB. Researchers can use the iPC platform to visualise, filter and select paediatric datasets for a later stage of analysis, as well as data requests to access private datasets. Specific guidelines to support the development of the metadata registry are provided, which consist of the recommendation of standards to fulfil both technical and scientific requirements of the platform. The platform's architecture is based on modules, which allow parallel developments and integration of different open source-based software components. The iPC platform is based on cloud technologies provided by BSC and will connect in the future to the high performance computing (HPC) capacities of iPC partners. HPC will facilitate the training and adjustment of highly computational intense machine learning (ML) models for paediatric cancer research. Since the platform is still in development, users are mostly early adopters who provide valuable feedback for the improvement of the platform's functionalities.

AML blasts and the non-malignant immune compartment has also been generated and is currently being analysed using clustering and trajectory inference.

that collect, integrate and harmonise high-quality assays, data and unstructured knowledge relevant to paediatric cancer. Knowledge relevant to paediatric cancers. The platforms are a foundation for the development and visualisation of intelligent models and algorithms that simulate virtual patients and their treatments. The second factsheet briefly explains the platforms developed during the project framework.

The Gabriella Miller **Kids First Data Resource Center** enables researchers, clinicians, and patients to work together to accelerate research and promote new discoveries for children affected with cancer and structural birth defects. The Data Resource Center is being developed by CHOP (Children's Hospital of Philadelphia). The Platform has harmonized next generation sequencing data from more than 21,000 probands and family members available for cross-disease research and more than 240 research groups have submitted applications through dbGaP to access these datasets to empower their research. 280 million variants across Kids First studies are searchable in the portal.

**PedcBioportal** for Integrated Childhood Cancer Genomics was also developed by Children's Hospital of Philadelphia and is an online, cloud-based cancer visualization and analytics application. The portal provides access to all the derived/processed cancer datasets in the Kids First Data Resource Centre as well as to newly generated CHOP harmonised data from the Therapeutically Applicable Research to Generate Effective Treatments (TARGET) programme. In the future, the platform will offer harmonised paediatric data across multiple histologies as freely accessible data for integration with additional resources such as the Academic Medical Centre Amsterdam's R2 platform.

**R2** is also a freely accessible online platform for data mining and visualisation specifically for biomedical researchers with little or no bioinformatics knowledge. It allows researchers to analyse their own and/or public data. The main goal of the platform is to reuse datasets beyond their original purpose. The platform is

### SHORT PROJECT INFO

Cancer is a very heterogeneous disease that arises in patients with a great variety of genomes, epigenomes and clinical history, and especially the treatment of paediatric cancers presents particular challenges that differ from the treatment of adult cancers. Therefore, the iPC aims to integrate high quality data sources and their analyses using knowledge-based and artificial intelligence models to increase the performance of individual datasets and improve therapeutic decision-making in paediatric cancers. The project's approach is based on the development of virtual patient models, i.e. in-silico avatars that resemble the molecular and clinical landscape of the paediatric patient and can be used for computer-assisted personalised diagnosis and treatment recommendations. iPC will therefore develop a computer-based platform that will also allow caregivers to interrogate the models to deduce the pros and cons of specific treatment combinations for each child. More information about iPC and its vision, motivation and objectives can be found on the project website.

developed by The Academic Medical Center in Amsterdam (AMC) and is actively collaborating with the Princes Maxima Center (PMC), the German Cancer Research Center (DKFZ), Ghent University (UGent) and Baylor College of Medicine (BCM). R2 has also a substantial user base with more than 30.000 users annually worldwide and it has been cited in more than 2.060 Pubmed publications. Furthermore, the platform is employed in a number of consortia and has been used in a number of seminal manuscripts describing new phenomena in genome research, such as enhancer hijacking etc.

**R2 RNA-Atlas data section** is an open access data section in the R2 portal for searching gene expression data from over 300 human cell types and tissues and predicting non-coding RNA regulatory networks. The atlas was developed by Ghent University together with The Academic Medical Centre Amsterdam and Baylor College of Medicine.

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## Consortium

22 Partners

3 Continents



## Duration

53 Months

01/2019 - 05/2023



Located in the USA and Australia

## Partners



Technikon Forschungs- und  
Planungsgesellschaft mbH  
Austria [Villach]



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More information about the consortium  
can be found on the project [website](#).



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