

## *Master project for students with a bioinformatics background*

### *Title*

Combination therapy prediction, from systematic literature review to in vitro validation

### *Hypothesis:*

Monotherapy for high grade glioma has failed to work. Therefore a personalized combination therapy is expected to improve the treatment for this disease. However, the number of possible drug combinations of drugs that are currently used in the clinic reaches up to 100,000 for each patient, which is too large to enable a comprehensive screening approach. Therefore we aim to develop an accurate drug-prediction model to enable prediction of synergy sets and prove them in an preclinical setting.

### *Techniques*

To enable to generate a prediction model, we will retrieve a large amount of peer reviewed publications using our data fetching module. This dataset will be validated using a set references that were retrieved manually. Drug dose response data will be integrated with these data, taking into account the genetic background and gene expression information and subsequently processed into a dose response prediction module. Subsequently, drug synergy can be predicted based on a drug synergy module and tested in the lab, for which we have a drug pipeline that currently has a capacity for over 20,000 assays per month.

### *Goals of the internship*

The student will get familiar with the tumor pathways that are affected by clinically available drugs. The student will learn, by using bioinformatics, to predict which pathways are activated. The student will learn to make a realistic and attainable plan for the internship. Scientifically, the student will learn how to define a research question within the context of the project, will systematically record progress of the daily work, will record and store complex data in a systematic way, will learn how to select relevant literature in a systematic way and integrate this with academic knowledge. For dissemination and social skill development the student will learn to show results during meetings in an orderly fashion, will learn to select relevant data to present, will learn how to write a report (scientific paper style) and will learn how to build a scientific network. A number of validation experiments will be performed to confirm the predictions. For the report, after a first revision round, the final version will be written and judged by an external examiner.

### *Supervision*

Data analysis will be done under supervision of Drs. Sjors in't Veld/Dr. Bart Westerman, Neuro Research Group, VUMC, Cancer Center Amsterdam CCA, De Boelelaan 1117, 1081 HZ Amsterdam, the Netherlands,

[a.westerman@vumc.nl](mailto:a.westerman@vumc.nl), 0031 (0)20 44 49073. This interdisciplinary group consisting of molecular biologists, technicians, medical doctors, neurologists is specialized in obtaining genetic information from patient material (tumor biopsies and blood based [liquid] biopsies) and is developing a pipeline that enables personalized medicine. Only full time, 6 month or longer internships are available.