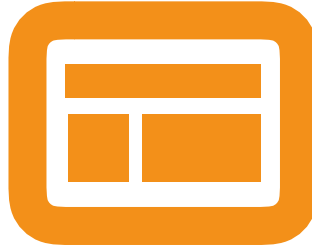# QureTEC
BIOINFORMATICS

DATA ANALYSIS

MACHINE LEARNING
DATA INTEGRATION
DEEP LEARNING
BIOSTATISTICS

CUSTOM SOFTWARE

DESIGN DEVELOPMENT
FLEXIBLE SOLUTIONS
NOVEL ALGORITHMS
VISUALIZATION

DATA MANAGEMENT

DATA HARMONISATION
DATABASE DESIGN
DATA CLEANING
WEB INTERFACE

CORE BIOINFORMATICS EXPERTISE

GENE REGULATION

PROTOARRAY ANALYSIS

OMICS INTEGRATION

IMMUNOLOGY

BIOMARKER DISCOVERY

ANTIBODY HUMANIZATION

TOXICOLOGY

MEDICAL IMAGE ANALYSIS

CONTACTS:
Quretec
Ülikooli 6a, 51003
Tartu, ESTONIA

quretec@quretec.com
www.quretec.com
+ 372 7309508

OMICS INTEGRATION

Quretec bioinformatics team has developed databases for collecting omics datasets and relevant metadata in Alzheimer's disease, stem cells, cancer and toxicology projects over the years. There is a close collaboration and knowledge transfer between Quretec and the University of Tartu. The research team has expertise in analyzing a multitude of high throughput omics data types and handling large datasets both public and project specific.

PROTOARRAY ANALYSIS

Our team has designed a Robust Linear Model based pipeline for protein microarray (protoarray) data analysis. The pipeline is available through a web interface that it is easy to use for non-bioinformatics experts. ProtoArray Web ExploreR (PAWER) web tool serves for analysing protein microarray studies. Quretec provides service for large scale protoarray data analysis (more than 100 samples).

MEDICAL IMAGE ANALYSIS

Quretec experts are participating in variety of academic and industrial collaborations. Our team is developing an automated solution based on Deep Neural Networks that is capable of robust detection of nuclei from microscopy images produced in different types of experiments. As a part of ongoing collaboration our experts are also developing a Deep Learning - based solution for skin cancer diagnostics from mole images of skin.

DATA ANALYSIS & BIOSTATISTICS

Quretec provides services in omics data (i.e gene expression, protein-protein interactions of various experimental origin, epistatic interactions, etc.) analysis. We provide our Machine Learning and Deep Learning expertise in analysing datasets originating from immunology-, ageing- and toxicology studies as well as from medical imaging and biomarker discovery research.

CUSTOM SOFTWARE DEVELOPMENT

Quretec develops tools and pipelines to analyse high-throughput sequencing data from phage display analysis and for antibody humanization. Designed pipelines includes preprocessing of raw data: cleaning and normalization. Quretec has also developed a number of data analysis tools for partner companies that are made accessible through web based management system. Tools and analysis pipelines have been custom tailored based on specific needs of the customer.

DATA MANAGEMENT

Quretec provides data management solutions that are implemented using Qure Data Management Platform. Data management solution is provided as a central platform that can store data from omics experiments, their accompanying metadata and protocols produced by different partners. The database is available for collected information retrieval and further analysis for all the project partners through web-interface.

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QureTEC

CORE COMPETENCES:

Software development and data management services for medical registries, biobanking, clinical trials, national statistics, bioinformatics, and biostatistics.

BIOINFORMATICS PROJECTS:

· **AgedBrainSYSBIO** - systems biology, network reconstruction, Alzheimer disease
· **SZ_TEST** - development of molecular diagnostics tools for early detection of schizophrenia by combining unbiased high-throughput comics data.
· **Development of Antibody Humanization Platform** - software development for humanization of non-human antibodies derived from animal sources
· **DETECTIVE** - biomarker discovery using repeated dose toxicity
· **ENFIN** - systems biology, network reconstruction and modeling
· **ESNATS** - alternative compound testing using embryonic stem cells
· **FUNGENES** - expression profiling of embryonic stem cells

SOFTWARE DEVELOPMENT REFERENCES:

· Estonian Genome Project
· Cancer registry
· HIV positives database
· Tuberculosis registry
· Medical birth registry
· Abortion registry
· Causes of Death Registry
· Statistics Estonia
· Infectious Diseases Information System
· Clinical Trials EDC and CTMS

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BUSINESS OVERVIEW:

Quretec is an SME with strong ties to academia. Quretec provides software development and data management services in medical registries, biobanking, clinical trials, national statistics, bioinformatics, and biostatistics. Quretec team consist of multidisciplinary experts with biological, computer science, bioinformatics and statistics backgrounds. Quretec together with Department of Computer Science, University of Tartu forms a joint bioinformatics, algorithmics, and data mining group BIIT. The main research topics and capabilities include gene regulation, gene expression data analysis, biological data mining, systems biology, combinatorial pattern matching, antibody humanization, developing software for biomedical research databases, as well as partnering in stem cell, toxicology and cancer related projects.

BIOINFORMATICS SERVICES:

Quretec Bioinformatics specialises in developing custom software for biomedical research, databases and e-health data management and analysis. We provide services for the analysis of biological data, omics integration using machine learning as well as the application of deep learning in the analysis of medical imaging. The company has extensive experience in collaborating both internationally and locally. Quretec has carried out bioinformatic research and developed software for many partners in systems biology (ENFIN, FP6), toxicology studies (ESNATS FP6, DETECTIVE FP7), embryonic stem cell development (ESNATS, FP7), Alzheimer disease (AgedBrainSYSBIO, FP7). Quretec has a long lasting collaboration for developing software for studying immune responses for Protobios company and has been developing antibody humanisation platform for Icosagen Cell Factory.

DATA MANAGEMENT SERVICES/PRODUCTS:

Qure Data Management Platform - Quretec's main product Qure Data Management Platform can be used for collection, handling, and analysis of data under high quality, security, and robustness requirements. The platform allows rapid deploying of complex studies, registries and statistical surveys, clinical trials, rich metadata (including file attachments), etc. The full IT solutions can be built using existing software by merely designing the data models and descriptions, and configuring the software.