**Master's Program “Data Mining and Bioinformatics”**

**PROGRAM DIRECTOR PROF. ALEXANDER ZAMYATIN**

The Master's Program “Data Mining and Bioinformatics” is a unique pilot program, developed in accordance with the innovative strategy of TSU.

The program is designed for 2 years (in accordance with Russian law system) and requires 120 credits ECTS.

**Program Description**

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| **Degree** | Master in Applied Mathematics and Informatics  |
| **Specialization** | Data Science & Bioinformatics |
| **Learning mode** | Full-time |
| **Duration of study** | 2 years, totally 120 ECTS |
| **Language of instruction** | English |
| **Entrance requirements** | 1. Bachelor Degree Certificate in the area of Informatics, Applied Mathematics, Computer Science or an equivalent.
2. Proof of the English language proficiency (level B2 or higher).
3. Sufficient result of entrance examination and interview.
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The main goal of this program is to train professionals in data mining and applied aspects of bioinformatics who are in high demand for carriers both in science and business.

**Three key features** of this program are:

* unique pilot program, created within the “road map” of Tomsk State University development program;
* focusing on forming teams of deficient multi-disciplinary specialists in the field of computer science, information technologies, applied math and also applied aspects of bioinformatics;
* strong scientific background in high-performance data processing in remote sensing and geoscience, natural language processing, bioscience etc. (projects funded by the RF Government, Russian Scientific Fund, Russian Foundation for Basic Research etc. ).

**Features of Implementation**

* Management of educational program with Academic Council, Director and Administrator (academic office)
* Attraction of all the necessary university departments (intra-faculty interaction)
* Attraction to development and implementation leading Russian and foreign scientific, educational and industry partners (prospective opportunity for “double degree” diploma)
* Program implementation in the English is coming

**Consulters and Partners**

* Goldsmiths College (University of London), Data Science group (UK)
* Dresden Technical University, Computer Science dept. (Germany)
* Siberian Medical State University (Tomsk), Russian National Research Medical University (Moscow)
* The Trade Representation of the Russian Federation (US)
* Arizona State University, Biodesign Institute (US)
* Center for Bioinformatics in Tomsk State University

We have been trying to initiate interesting research projects which would be relevant to modern science and business:

* Intro to Data Mining
* Multivariate Analysis and Data Visualization
* Practical Machine Learning
* High Performance Data Processing (Map Reduce, Hive, MPI, NoSQL etc.)
* Cloud Computing
* Script Languages (Python, R)
* Algorithms and Data Structure
* Mathematical Models for Decision Support
* Molecular Sequence Analysis
* Molecular and Structure Biology
* Comparative Genomics
* Technical and Structure Bioinformatics
* Biotechnology
* Algorithms in Bioinformatics
* Statistical Sequence Analysis
* Natural Language Processing
* Project and Product Management in Software Development

**Core courses**

* Scripting Languages
* Introduction to Data Mining
* Project Management for Software Development
* Applied probability analysis
* Post-relational databases
* Decision-making Mathematical models
* Computer Modelling
* Applied aspects of machine learning
* Efficient algorithms
* Multivariate data analysis and Visualization
* Parallel and Distributed Programming
* Cloud computing and Technology
* High-performance Data Processing Technology
* Introduction to bioinformatics
* Analysis of molecular sequences
* Comparative genomics
* Molecular genetics
* Basics of biotechnology
* Molecular biology