



ITMO UNIVERSITY

St. Petersburg, Russia

DOUBLE DEGREE
MASTER'S PROGRAM

COMPUTATIONAL BIOMEDICINE

INTERNATIONAL MASTER DEGREE
PROGRAM TAUGHT IN ENGLISH

Key information about the study program

First year in ITMO, Second year in University of Amsterdam (UvA)

en.ifmo.ru
2016

CONTENTS OF MASTER'S PROGRAM COMPUTATIONAL BIOMEDICINE

1st YEAR

Saint Petersburg, Russia

Applied Mathematics and Informatics	5	Big Data and Internet technologies	1	Research Work	8	Choose 1 of 2: Academic English / Effective Intercultural and Business Communication
Continuous Mathematical Models	6	Discrete Mathematical Models	5	Practice	2	

1 semester 30 ECTS ITMO

Big Data and Internet Technologies	3	Machine Learning Methods	3	Medical Informatics	3	Research Work	8
Probabilistic Mathematical Models	4	IT for Intensive Therapy	3	Practice	2	Choose 1 of 2: Medical Statistics / Mathematical Epidemiology	4

2 semester 30 ECTS UvA

Predictive Modelling in Biomedicine	6	Research Work	8	Choose 1 of 2: Biomedicine Visualization / Medical Radiation Technologies	3	Choose 1 of 2: Decision Support Systems in Bioinformatics / Telemedicine	5
Genomics and Bioinformatics	6	Practice	2				

3 semester 30 ECTS UvA or ITMO

State Exam	3	Practice	6	Master Thesis	21
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WHY TO BECOME A MASTER OF COMPUTATIONAL BIOMEDICINE AT ITMO UNIVERSITY?

This innovative Master's program was launched in 2016, has a network structure, and includes practice-oriented disciplines implemented on the basis of the Professor Vladimir Almazov North-West Federal Medical Research Center.

The program aims to train professionals in IT to effectively apply predictive modeling methods and process BigData sets for translational medicine and public health domains. Fields of study include but are not limited to:

- theoretical foundations, methods, and technological support of decision-making for 4P medicine (Personalized, Prevented, Predicted, Participatory Medicine)
- methods and algorithms for bioinformatics and genomic research
- protein structure modeling and design of drugs
- models of physiological processes in the human body (Virtual Physiological Human)
- DSS for health care institutions
- epidemiological studies using Big Data to analyze external environmental, cultural and socio-economic factors



EXAMPLES OF TOPICS OF COMPLETED RESEARCH WORKS OF OUR MASTER STUDENTS:

1. Hemodynamic processes visualization using Fusion technology.
2. Multi-agent simulation of a virtual community, located in a deadly disease epidemic.
3. Methods and tools of interactive extraction data from medical information systems.
4. Clustering and classification methods used in the risk assessment of cardiovascular diseases
5. Multi-agent simulation of patients and staff movement dynamics in the hospital.

Duration and format:

4 semesters,
full-time

Total workload:

120 (ECTS)
credits

Training methods:

Lectures, seminars, hands-on workshops, research work, project-based learning, creative and collaborative virtual learning environment

Objective of the Program:

The new program is the joint project between ITMO University and Federal Almazov North-West Medical Research Centre which aims to contribute the partnership in the field of computational methods and informational technologies for medical research. World society needs new generation of medical researchers facing the challenges of modern medicine and being well-qualified in IT areas.

The program aims to train professionals in the field of Information Technologies able to apply effectively predictive modeling methods and process BigData sets for translational medicine and public health domains, bioinformatics and genomic research.

Admission Requirements:

- Bachelor's degree in STEM, in particular, ICT and Programming
- Standard data structures and algorithms, programming skills in C ++ / C # / Java
- Ability to apply current mathematical packages and data processing languages (Python / R / MathCAD / MatLab)
- Upper intermediate knowledge of English (IELTS 6.5 or TOEFL more than 95)

Participants:

International and Russian students

Diplomas received:

- Master of Science (MSc) of University of Amsterdam, The Netherlands
- Master of Science Diploma of ITMO University in the field of Applied Mathematics and Informatics





PARTNERS OF THE PROGRAM



Almazov Federal North-West Medical Research Centre was founded in 1980 as an Institute of Cardiology. Today, Almazov Federal Centre is one of the leading Russian centers to provide high tech medical care, implement scientific and fundamental applied research into clinical practice, and train scientific personnel.

Federal Almazov Centre's structure includes new high-tech Inpatient and outpatient clinic with Treatment and Rehabilitation Complexes, Federal Specialized Perinatal Center, Polenov Neurosurgical Institute as the division of the Centre, Clinical Trials Unit, Biobank and Animal House to provide the best care to every patient through integrated clinical practice, education and research together with latest technologies and innovations.

ITMO University prioritizes such research areas as IT, photonic technologies, robotics, quantum communication, translational medicine, urban studies, art&science, and science communication. Starting from 2013, the university is a member of Project 5-100, which unites 15 top Russian universities to improve their status in the international research and education arena.

IT's MORE than a UNIVERSITY!

Double Degree Master's Program structure:

- 1st semester: ITMO University 30 ECTS
- 2nd semester: ITMO 30 ECTS
- 3rd semester: UvA 30 ECTS
- 4th semester: UvA and ITMO 30 ECTS

(1) We will accept a Master thesis in one language (English) with a summary in Russian;
(2) We will organize just one thesis defense procedure (also in English), where two Master Exam Committees will be present: from UvA and from ITMO.

Computational Science has become an indispensable tool in all fields of human life: from traditional physics and engineering to biology, medicine, economics, arts, sociology and to fashion or criminology.

The University of Amsterdam pioneered this field by establishing the Computational Science group in 1990 and a Master's program in 2005. The Faculty of Science at UvA has more than 70 international master programs including MSc in Computational Science run by Professor Sloot's research group. The Computational Science group led by Professor Peter Sloot has been collaborating with eScience research institute ITMO University within several projects starting 2007.

Studying in The Netherlands is a happy and exciting experience for Russian students. Dutch people are very open and friendly with foreigners, and the University of Amsterdam is oriented towards international students and offers a number of services and support facilities to ensure smooth and pleasant stay and efficient study process. LUT promotes business generated by scientific research. This is demonstrated by the university's own investment company Lureco, which supports LUT's research-based start-up companies.





The Academic Medical Center (Dutch: Academisch Medisch Centrum), or AMC, is the university hospital affiliated with the Universiteit van Amsterdam (University of Amsterdam).

It is one of the largest and leading hospitals of The Netherlands, located in the Bijlmer neighborhood in the most south-eastern part of the city. AMC consistently ranks among the top 50 medical schools in the world.

The AMC has an intensive cooperation with the other university hospital of Amsterdam, the VU University Medical Center (VUmc), which is affiliated with the VU University Amsterdam, Amsterdam's other university.

Tertiary care departments include advanced trauma care, pediatric and neonatal intensive care, cardiothoracic surgery, neurosurgery, infectious diseases and other departments.



REPUTATION:

The UvA ranks 55th overall in the QS World University Rankings 2015, where it is the top-ranked university from the Netherlands. The UvA offers a unique opportunity to pursue academic studies in a truly international environment.

ITMO University, Saint Petersburg is a national research university, the leading Russian university in the field of information and photonic technologies. The university is the alma mater of winners of numerous international programming competitions: ACM ICPC (the only six-time world champions), Google Code Jam, Facebook Hacker Cup, Yandex.Algorithm, Russian Code Cup, Topcoder Open etc.

Almazov Federal North-West Medical Research Centre is a modern medical centre counting 1450 beds, 5500 staff (among them 700 researchers), 7 research institutes, 25 international partners, 45 contracts for clinical trials, 11 chairs for postgraduate medical students, da Vinci Robot and unique Hybrid Cath Lab, the latest equipment, new technologies, last generation materials and highly qualified experts.



ITMO UNIVERSITY

Founded on March 26th 1900, ITMO is one of the oldest educational institutions in Russia. We are one of 15 universities in Russia awarded a federal grant to improve the position in the world university ratings by 2020. More than 40 international research laboratories, headed by world's leading scientists, operate at the University.

The mission of ITMO University is to prepare its graduates for the challenges of the 21st century. Serving over 13,000 students, our 14 departments offer 104 bachelor degree programs, 146 master degree programs, and 45 PhD programs. On the forefront of scientific research, ITMO University tackles some of the world's top scientific challenges and strives to support an environment of interdisciplinary scholarship and innovation. Some of our best-known research work is in Photonics, Precision Mechanics, Computer Science and Information Technology.

KEY FACTS

Admission requirements

1. Bachelor's degree in the field of computational science or equivalent, completed with good grades; and in UvA
2. Sufficient proficiency in the English language. The minimum score required on the TOEFL Internet-based test (iBT) is 90, IELTS test: 6.5, and a Cambridge Examination Score with a minimum test result of CAE A or B

Admission tests

- Basic knowledge of mathematical analysis, numerical methods and programming technologies.

Admission procedure

- Written on-line application. Application deadline – July, 25
International applicants may find additional information concerning admission at the official web-site of ITMO University en.ifmo.ru

Semester and date begin

- Winter semester – September 1

Length of programme

- 2 years

Degrees awarded

- Master of science (MSc)

Tuition fees

- Tuition fee in ITMO is state-funded or 170 000 RUR per 1 year.
The tuition fee in UvA is 1835 Euro.

IT's *More than a* UNIVERSITY

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