

**Y**andex



**Faculty of Computer Science**

National Research University Higher School of Economics

# Faculty of Computer Science

Established in March 2014

**3**

Bachelor's Programmes

**12**

Labs

**7**

Master's Programmes

**274**

Faculty Members

**1**

Doctoral School

**11**

RSF Grants

**2189**

Students

**1**

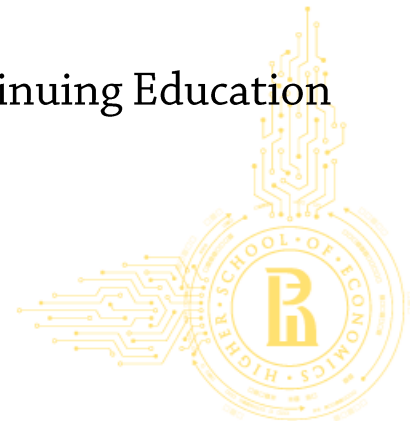
Centre for Student Competitions

**177**

Foreign Students

**1**

Centre for Continuing Education



# Bachelor's Programmes

**Applied Mathematics and  
Informatics**

**Y**andex

893

Students

4

Years

Ru/En

Language

**Software  
Engineering**

**○ ABET**

706

Students

4

Years

Ru/En

Language

**Data Science and Business  
Analytics (since 2018)**

Awarding Body



Academic Direction



147

Students

4

Years

En

Language



# Master's Programmes

**Data Science**

163

Students

2

Years

Ru/En

Language



**Statistical Learning  
Theory**

42

Students

2

Years

En

Language

**Skolkovo Tech**

Skolkovo Institute of Science and Technology



# Master's Programmes

**Financial Technologies and  
Data Analysis**



70

Students

2

Years

Ru/En

Language

**Data Analysis in Biology and  
Medicine**

42

Students

2

Years

Ru/En

Language



# Master's Programmes

**System and Software  
Engineering**

74

Students

2

Years

En

Language

**System  
Programming**

35

Students

2

Years

Ru/En

Language

**ISPRAS**



# Doctoral School

**PhD in Computer Science**

40

Students

3-4

Years

Ru/En

Language

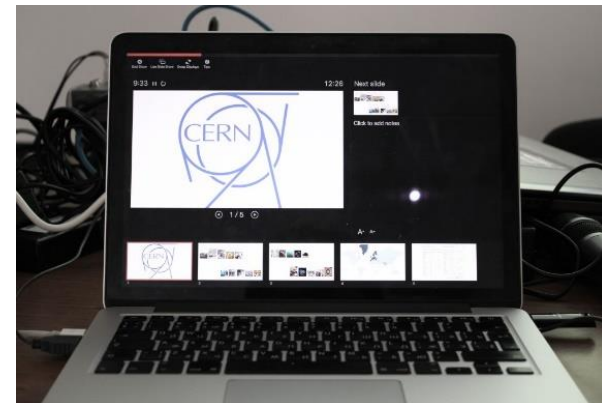
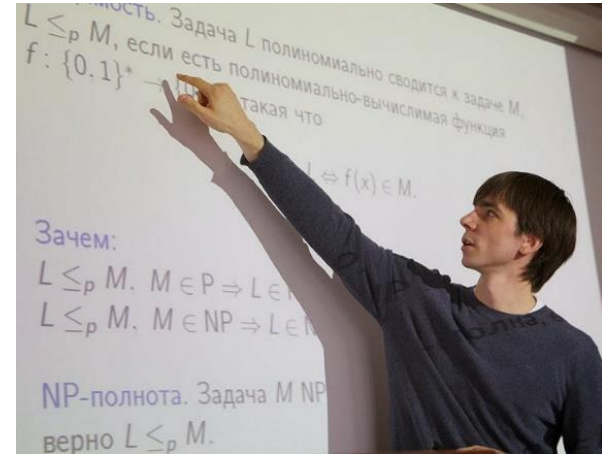
## Recent graduates:

- Roman Chereshnev, “Human Gait Controlling System Using Machine Learning Methods Suitable for Robotic Prostheses for Patients Suffering from Double Transfemoral Amputation”
- Dmitry Frolov, “Aggregate Representation of Texts for Information Retrieval”
- Artem Grachev, “Methods of Recurrent Neural Network Compression for Natural Language Processing”



# Research

- Deep Learning and Bayesian Methods Centre
  - Samsung-HSE Lab
  - Sberbank-HSE Financial Data Analysis Lab
- Process-Aware Information Systems Lab
- Methods for Big Data Analysis Lab
- Intelligent Systems and Structural Analysis Lab
- Stochastic Algorithms and High-Dimensional Inference Lab
- Theoretical Computer Science Lab
- Algebraic Topology and Its Applications Lab
- Bioinformatics Lab
- Complex Systems Modeling and Control Lab
- Models and Methods of Computational Pragmatics Lab





# Joint Departments

Joint Department with Yandex



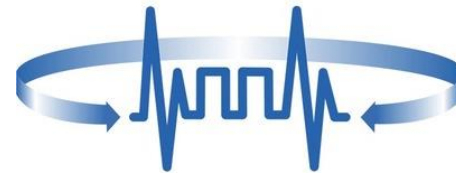
Joint Department with SAS



Joint Department with the Federal  
Research Center of Computer Science  
and Control



Joint Department with the Institute  
for Information Transmission  
Problems



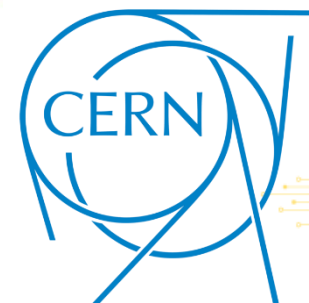
Joint Department with the Institute  
for System Programming RAS



# Partners

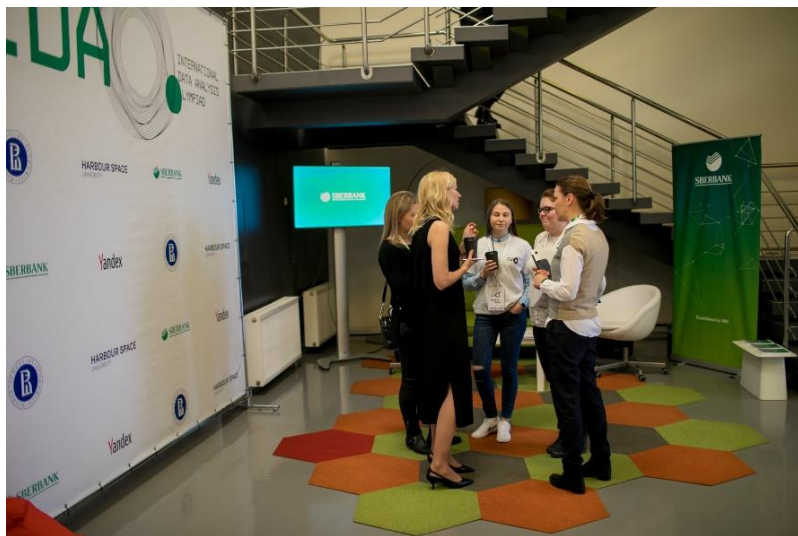


Skolkovo Institute of Science and Technology



## Joint Master's Programme in Financial Technologies and Data Analysis

- The Programme is offered in collaboration with Sberbank
- Sberbank covers 100% of tuition fee for students
- Practical classes with data science experts from Sberbank



## Joint projects:

- IDAO 2018 and 2019 - Sberbank was a partner of the Olympiad
- Centre of Deep Learning and Bayesian Methods helped Sberbank to solve several data science tasks



## Samsung-HSE Laboratory

- develops mechanisms of Bayesian inference in modern neural networks, which is to solve a number of problems in deep learning
- Between HSE Centre of Deep Learning and Bayesian Methods and Samsung AI Center
- Summer School on Deep Learning and Bayesian Methods



## The major areas of research are:

- Sparsification and acceleration of deep neural networks
- Ensembles of ML algorithms
- Uncertainty estimation and defenses against adversarial attacks
- Loss-based learning for Deep Structured Prediction
- Stochastic optimization methods
- Learning and inference methods for probabilistic models using tensor decomposition







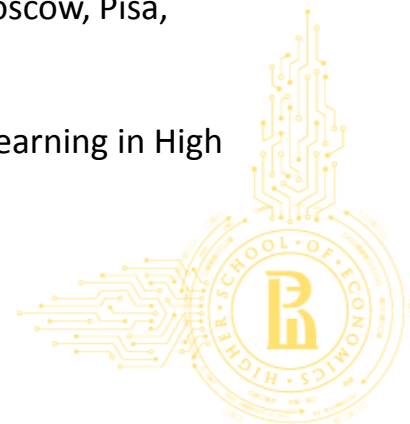
## HSE is an LHCb Associate Member at CERN

- HSE researchers have full access to data from the collaboration and allow the university to participate in various projects
- The group from HSE consists of researchers from the Laboratory of Methods for Big Data Analysis (LAMBDA)



## Joint events with CERN

- Annual CERN masterclass in particle physics: video conference between Moscow, Pisa, Paris, Cagliari, Rio de Janeiro.
- Summer School on Machine Learning in High Energy Physics



# International Summer Schools



## Summer School on Deep Learning and Bayesian Methods, August 27 – September 1, 2020

- Participants: students, graduate students and industry representatives
- 7 countries (Great Britain, Spain, Netherlands, Belarus, USA, France, Switzerland)
- In partnership with Samsung AI Center

**SAMSUNG**

## 6<sup>th</sup> Summer School on Machine Learning in High Energy Physics, July 16 – 30, 2020

- Cities: Lausanne, Hamburg, Oxford, Reading, Lund, St Petersburg
- In partnership with Yandex School of Data Analysis and LHCb CERN
- Participants: students and faculty members



# Rankings



	2017	2018	2019
<b>QS Overall</b>	411-420	382	343
<b>QS Under 50</b>	51-60	48	38
<b>QS Mathematics</b>	151-200	101-150	101-150
<b>QS Computer Science</b>	351-400	251-300	201-250



# Rankings



**2017**

**2018**

**2019**

<b>ARWU Mathematics</b>	101-150	76-100	76-100
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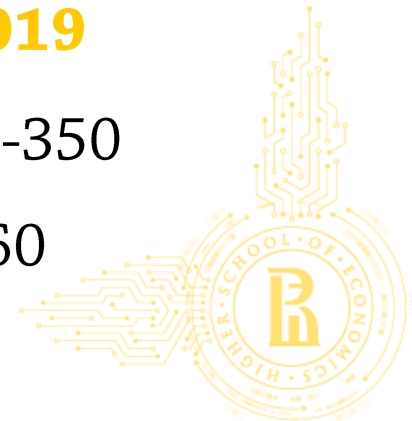
**2017**

**2018**

**2019**

<b>THE Overall</b>	401-500	351-400	301-350
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<b>THE Under 50</b>	96	84	60
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# Foreign Partner Universities



TU/e



POLITECNICO  
DI MILANO

A!  
Aalto University



TECHNISCHE  
UNIVERSITÄT  
DRESDEN

UCA  
UNIVERSITÉ  
Clermont  
Auvergne

UP  
EM

UNIVERSITÉ  
PARIS-EST  
MARNE-LA-VALLÉE

UNIVERSITEIT  
GENT



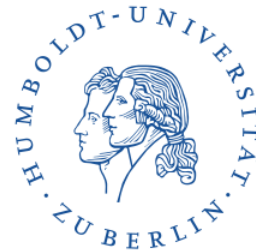
UNIVERSITEIT  
STELLENBOSCH  
UNIVERSITY

UNIVERSITY  
OF TWENTE.



香港中文大學 (深圳)  
The Chinese University of Hong Kong, Shenzhen

UC San Diego



Universidad  
Carlos III de Madrid  
[www.uc3m.es](http://www.uc3m.es)



Radboud  
Universiteit  
Nijmegen

Grenoble INP

UNIVERSITÉ  
Grenoble  
Alpes



SAN DIEGO STATE  
UNIVERSITY



university of  
groningen

Lappeenranta  
University of Technology



# Competitions and Olympiads

Centre of Student Competitions of the Faculty of Computer Science helps students to prepare for various team and individual contests including ICPC, Yandex.Algorithm, Google Code Jam, Russian Code Cup and etc. HSE Faculty of Computer Science team won the bronze medal at ICPC World Finals 2019.

**2015**

**ICPC** Final Morocco



**2016**

**ICPC** Final USA



**2017**



**2018**

**ICPC** Final China



**VJIMC**  
Czech Republic

**2019**

**ICPC** Final Portugal  
Bronze Medal

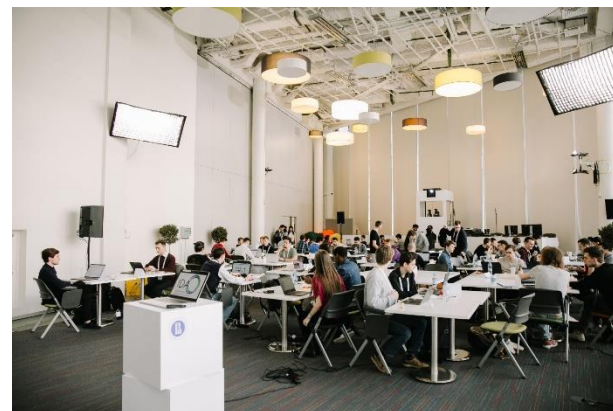


# International Data Analysis Olympiad

Higher School of Economics and Yandex organized the contest for the 3<sup>rd</sup> time.

Key numbers of IDAO 2020:

- 2756 participants registered for the Online Round
- 83 countries
- 34 teams in the Final Round

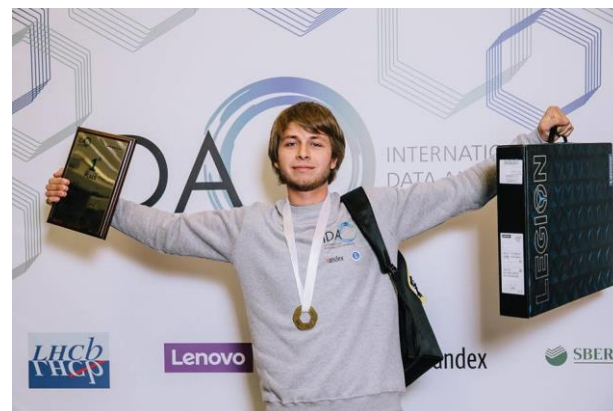


ORGANISERS

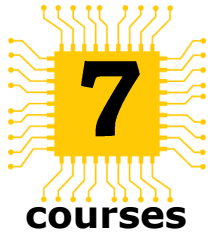


Yandex

PARTNERS

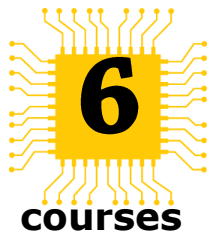


# Coursera specializations



Advanced Machine Learning

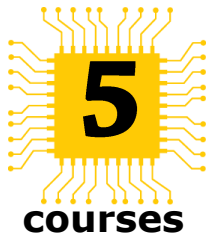
Yandex



Data Structures and Algorithms

Yandex

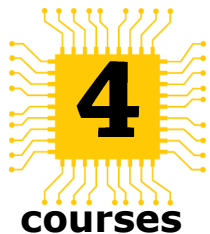
[UC San Diego](#)



Introduction to Discrete Mathematics for  
Computer Science

Yandex

[UC San Diego](#)



Introduction to Discrete Mathematics for  
Computer Science



# Online Degree “Master of Data Science”

The first English-taught **fully Online** Data Science Degree Programme from a Russian university.



**coursera**

Industry Partner: **Yandex**

**32 online courses**, divided into 4 blocks:

Mathematics block

Programming block

Professional block

Project block

**3 tracks:**

- Data Scientist
- Machine Learning Engineer
- Researcher in Data Science

**High level of Support**

- live sessions with Instructors
- communication via Slack and Zoom
- weekly office hours
- staff-graded assignments
- hands-on projects

**Applications are open twice a year:**

- Winter
- Fall



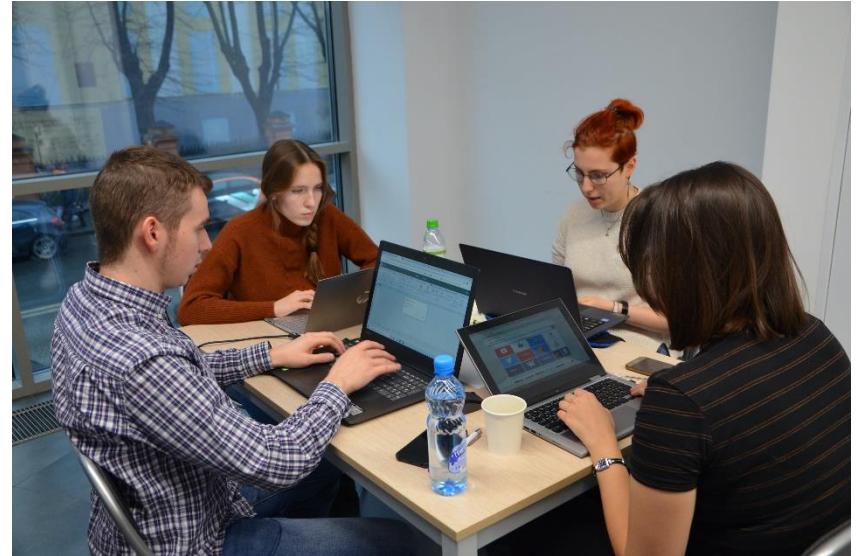


# Data Culture Project

The key idea is to help all the students develop a set of digital and data processing skills in such areas as:

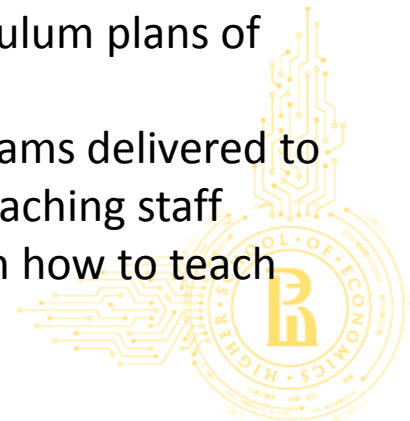
- Digital literacy
- Programming
- Data analysis

Training of students goes hand in hand with the training of teaching staff since 2017



## Achievements:

- 50+ offline courses launched
- 3 online courses developed and integrated into curriculum plans of 5000+ students
- 4 development programs delivered to administrative and teaching staff
- 3 teacher trainings on how to teach data tools conducted





computerscience@hse.ru  
<https://cs.hse.ru/en/>