FUNCTIONAL AND BAYESIAN DATA ANALYSIS

Moscow Institute of Physics and Technology (National Research University)

Degree or qualification is awarded: **PhD (Candidate of Science)**

Language of study: **English**
Mode of study: **full-time**
Duration: **4 years**
Availability of free education: **yes**
Price: **375 000 RUB**

Programme curator: **Denis Ustyuzhaninov**
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Entry requirements:

- Master's degree / equivalent in a related field
- B2 level of English
- Good track record of publications related to the topic of the intended research
- Strong research proposal 1,500 - 3,500 words

Research supervisor:
Vadim Strijov
PhD, DSc

Supervisor's research interests:
The goal of research in machine learning is the creation of optimal forecasting models. We must generate a family of models and select a model of an optimal structure. The model structure is a stochastic graph, it is a point in continuous space. The selection criterion is a differentiable function, so the optimization of a model structure goes smoothly. To generate models, we use methods of functional data analysis. To select models, we use methods of Bayesian inference.

Research highlights:

- Perform computational experiments to analyze models with applications in physics, chemistry, and biology.
- Collaborate with international research groups.
- Publish results in top-rated journals.

Supervisor's specific requirements:

- Algebra and Mathematical (functional) analysis.
- Stochastic processes and Statistics.
- Programming and writing skills.

Main publications:

- Bakhteev O.Y., Strijov V.V. Comprehensive analysis of gradient-based hyperparameter optimization algorithms // Annals of Operations Research, 2020: 1-15.
- Aduenko A.A., Motrenko A.P., Strijov V.V. Object selection in credit scoring using covariance matrix of parameter estimations // Annals of Operations Research, 2018, 260(1-2): 3-21.
- Motrenko A.P., Strijov V.V. Multi-way feature selection for ECoG-based brain-computer interface // Expert Systems with Applications, 2018, 114(30): 402-413.
- Katrutsa A.M., Strijov V.V. Comprehensive study of feature selection methods to solve multicollinearity problems according to evaluation criteria // Expert Systems with Applications, 2017, 76: 1-11.
- Kulunchakov A.S., Strijov V.V. Generation of simple structured Information Retrieval functions by genetic

algorithm without stagnation // Expert Systems with Applications, 2017, 85: 221-230.

Specializations within this programme