MODELS, ALGORITHMS AND SOFTWARE IN APPLIED COMBINATORIAL OPTIMIZATION

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 webpage at the university website:
https://eng.mipt.ru/programs/models-algorithms-and-software-in-applied-combinatorial-optimization/

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:
Boris Goldengorin
PhD, DSc (Russian Academy of Sciences)
PhD (University of Groningen, The Netherlands)

Supervisor's research interests:
Data Correcting and Tolerance Based Algorithms representing a unified approach to modeling and solving problems in Applied Combinatorial Optimization, e.g. Preemptive Single Machine Scheduling, Maximization (Minimization) of Submodular (Supermodular) Functions, Pseudo- Boolean Polynomials in Multidimensional Big Data Aggregation, Max-Clique, Max-Cut (including Quadratic Cost Partition), Capacitated Vehicle Routing in Cloud Computations applied to Virtual and Physical Resources, Facility Locations, Cell Formation in Industrial Engineering some of which might be found on https://www.amazon.com/Boris-Goldengorin/e/B00AR073TE

Research highlights:
The aim of this program is to establish worldwide competitive Mathematical Models, Algorithms, and Software with the purpose to solve computationally intractable benchmark instances.

Supervisor's specific requirements:

- Advanced courses in Mathematical Programming, Discrete (Combinatorial) Optimization, Algorithms and Data Structures, Mathematical Statistics and Standard Software.
- Ability to design and implement algorithms including the proof of their correctness based on advanced data structures.
- At least 3 years' experience in C++, MATLAB, CPLEX or similar software.
- Shortlisted candidate will be invited for a 30-min skype interview and one week for implementation an algorithm with reported computational study.

Main publications:

- B. Goldengorin, D. Krushinsky, P.M. Pardalos. Cell Formation in Industrial Engineering, NY, Springer, 2013, 220 pp.
- B. Goldengorin, P.M. Pardalos. Data Correcting Approaches in Combinatorial Optimization, NY, Springer, 2012, 120 pp.

Specializations within this programme