

NUMERICAL METHODS FOR PDE, COMPUTATIONAL FLUID DYNAMICS

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/numerical-methods-for-pde-computational-fluid-dynamics/>

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:

[Aleksandr Chikitkin](#)

PhD

Supervisor's research interests:

- Numerical simulation of high-speed flows around complex-shaped bodies.
- High-order numerical methods.
- Parallel high-performance computing.
- Finite-volume methods.
- Numerical methods for kinetic equations.
- Machine learning methods for CFD.

Research highlights:

- Work in collaboration with leading researchers from University of Manchester, University of Trento.
- Access to supercomputer (>1000 cores).
- Publications in high quality journals.

Supervisor's specific requirements:

- Master of Science degree in a relevant field.
- Strong background in basic numerical methods.
- Good programming skills (One of Fortran/ C++ / Python).
- Fluent English.

Some background in aerodynamics, finite-volume methods, CFD simulations is an advantage.

Main publications:

- Chikitkin, A., Utyuzhnikov, S., Petrov, M., & Titarev, V.. (2020). Non-overlapping Domain Decomposition for Modeling Essentially Unsteady Near-wall Turbulent Flows. *Computers & Fluids*, 104506.
- Chikitkin, A.V., Kornev, E.K., & Titarev, V.A. (2019). Numerical solution of the Boltzmann equation with S-model collision integral using tensor decompositions. *arXiv preprint arXiv:1912.04582*.
- Chikitkin, A.V., & Rogov, B.V. (2019). Family of central bicomact schemes with spectral resolution property for hyperbolic equations. *Applied Numerical Mathematics*, 142, 151-170.
- Titarev, V.A., Utyuzhnikov, S.V., & Chikitkin, A.V. (2016). OpenMP+ MPI parallel implementation of a numerical method for solving a kinetic equation. *Computational Mathematics and Mathematical Physics*, 56(11), 1919-1928.

Specializations within this programme