

# PETR KUNGURTSEV

PHD CANDIDATE, UNIVERSITY OF CAMBRIDGE – MSc PHYSICS

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 Corwinpro

 petrkungurtsev.me

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## ABOUT ME

**Research Skills** Optimization, adjoint sensitivity analysis, computational fluid dynamics, PDEs  
**Programming** Python (numpy / scipy / sympy / sklearn), FEniCS, git  
**Interests** Statistics, Machine Learning, Game Theory, puzzles

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## EDUCATION

**University of Cambridge, PhD in Engineering** Cambridge, UK (2016–Present)  
- Thesis: “Adjoint sensitivity analysis and shape optimization in complex flows”  
- Research areas: Sensitivity and adjoint methods; shape optimization; fluid dynamics  
**Novosibirsk State University, BSc and MSc in Physics** Novosibirsk, Russia (2010–2016)  
- GPA: 5.0 / 5.0  
- Worked as a student representative of over 700 students

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## WORK AND RESEARCH EXPERIENCE

**University of Cambridge** Cambridge, UK (2016 - Present)  
Research Assistant  
- Developed adjoint-based method for optimal flow control in acoustic devices  
- Implemented full-cycle shape optimization tool using Python: CAD model construction, Finite Elements flow modelling, gradient-based optimization  
- Supervised final year student project (3D inkjet printhead shape optimization)  
**Institute of Theoretical and Applied Mechanics** Novosibirsk, Russia (2014 - 2016)  
Junior Research Assistant, Computational Aerodynamics  
- Developed laser-gas interaction model using Monte Carlo method and implemented it with C++/ MPI / bash

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## PUBLICATIONS

- P. Kungurtsev, M. Juniper, Adjoint based shape optimization of the microchannels in an inkjet printhead, *Journal of Fluid Mechanics*, 2019
- P. Kungurtsev et al., Non-resonant gas-optical lattice interaction with feedback from the gas to the laser radiation, *30th International symposium on rarefied gas dynamics*, 2016.
- P. Kungurtsev et al., Simulation of non-resonant gas-optical lattice interaction, *ICMAR*, 2016.

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## COMPETITIONS AND PERSONAL PROJECTS

**PySplines** (February 2019 - Present)  
- The module is oriented on CAD-based shape generation and optimization use cases  
- Developed a `sympy`-based module for efficient generation of rational B-Splines and their properties  
- Acquired code documentation and testing skills with Sphinx and `unittest`, `pytest`  
**Halite III AI Challenge** (Oct 2018 - Jan 2019)  
- Developed and implemented a multiagent strategy for a resource management game (Python)  
- Implemented optimal parameter estimation using Kalman filtering  
- Top 2.5% on the final leaderboard (at 100th place among 4000+ players)  
**Microscale cooling device project** (2014 - 2016)  
- Prototyped and developed microscale cooling solution for CPUs and GPUs with extreme heat fluxes  
- Awarded two-year grant from FASIE Startup Fund, amounting to £8,000  
- Managed and led a small group of researchers. Presented the project to general public and investors

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## COURSES

- [Machine Learning](#) by OpenDataScience
- [Intro to Machine Learning](#) by HSE & Yandex
- [Probability theory](#) by Stepik
- [Python](#) by CS Centre ([notes](#))
- Project Management by Noveo Software University

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## AWARDS & SCHOLARSHIPS

- Marie Curie PhD Fellowship (2016-2019)
- 4 × British Petroleum: academic records (2012-2016)
- Baker Hughes: scientific innovations (2014)
- MDM bank: outstanding high school students (2008)