

Andrey Churkin

Quantitative energy analyst with an electrical engineering background and 9+ years of experience in mathematical optimisation, machine learning, and forecasting for electricity markets and power systems. Builds data-driven tools and models for trading, asset optimisation, and operational decision support.

a.churkin@imperial.ac.uk | [LinkedIn](#) | [GitHub](#) | [Website](#) | [YouTube](#) | [Google Scholar](#)

Experience:

- Mar 2024 present **Imperial College London**, Dyson School of Design Engineering, London, UK
Research Associate in AI and Analytics for Electricity Markets
- Built forecasting and anomaly detection tools for battery storage trading in intraday electricity markets, using 27.3M bid/ask price updates from 8,737 DK1 sessions ([ViPES2X](#) project). Demonstrated that anomalous trading patterns can be reliably detected after only 30% of the trading session.
 - Developed weather-driven analytics for real-time dynamic line rating in UK distribution networks, using multiple weather and climate datasets ([3DAR](#) project). Quantified thermal line limits and demonstrated potential average capacity uplifts of 12–47% across analysed circuits.
 - Designed and evaluated forecast valuation mechanisms for electricity data markets, combining mathematical optimisation, cooperative game theory, and Monte Carlo simulation.
- Mar 2021 **The University of Manchester**, Department of Electrical and Electronic Engineering, Manchester, UK
Mar 2024 *Research Associate*
- Built optimisation tools for distribution, transmission, and TSO-DSO joint planning using multi-stage stochastic investment models (Horizon 2020 [ATTEST](#) project).
 - Implemented recursive optimisation algorithms for European networks (UK, Croatia, Spain, Portugal), demonstrating up to 57% reductions in investment costs and embodied carbon vs BaU planning.
 - Developed models to quantify aggregated DER flexibility in distribution networks, identifying operational constraints and coordination challenges.
- May 2017 **United Nations ESCAP**, Energy Division, Bangkok, Thailand
Sep 2017 *Intern*
- Built optimisation models for cross-border power trading and transmission investment in Northeast Asia, showing potential generation cost savings of \$7.84bn per year from regional cooperation.
- May 2016 **CROC Inc.**, IT department, Moscow, Russia
Oct 2016 *Engineer in Industrial Solutions for Energy*
- Prepared network data and validated state estimation results for the integration of PSControl SCADA across 6 regional distribution networks.
- Feb 2015 **Moscow Power Engineering Institute**, Electrical Power Systems Department, Moscow, Russia
May 2016 *Engineer*
- Developed training simulator software for electrical substation operations. Co-inventor on a patent for the training interface system and simulator design.

Education:

- Oct 2016 **PhD in Engineering Systems**
Nov 2020 Skolkovo Institute of Science and Technology (Skoltech), Moscow, Russia
Thesis title: Stability analysis in coalitional games for cross-border power interconnection planning
- Sep 2014 **MSc in Electrical Engineering**, graduated with honours (average score 4.94 / 5.00)
Jun 2016 Moscow Power Engineering Institute, Electrical Power Systems Department, Moscow, Russia
- Sep 2010 **BSc in Electrical Engineering**, graduated with honours (average score 4.79 / 5.00)
Jun 2014 Moscow Power Engineering Institute, Electrical Power Systems Department, Moscow, Russia

Skills:

- Core:** Mathematical optimisation (linear, nonlinear, mixed-integer, stochastic), machine learning, forecasting, electricity markets, power system modelling, data valuation, game theory.
- Programming:** Python (NumPy, Pandas, Scikit-learn, Pyomo, Xarray, GeoPandas, Gymnasium), Julia (JuMP, Ipopt, Gurobi, PowerModels, PowerModelsDistribution, DataFrames, Flux), MATLAB.
- Other tools:** Graph analytics (Gephi, NetworkX), vector graphics software, LaTeX.

Interests: Chess ([FIDE rating](#) 1600), classical piano, Brazilian jiu-jitsu

Languages: English (fluent), Russian (native), Mandarin Chinese (intermediate), Spanish (intermediate)