Mariia Timofeeva

DATA SCIENTIST

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LinkedIn
Github
Publications

EXPERIENCE

Computational Data Scientist March, 2025
ARC Digital Bioprocess Development Hub, CSL Limited Present

- Developing a hybrid model that integrates a data-driven approach (ML algorithms including RF, XGB) with a mechanistic framework (ordinary differential equations (ODEs), computational fluid dynamics (CFD)) to predict the performance of pharmaceutical bioreactors across different scales and operating conditions.
- Applying data science techniques, including data cleaning, transformation, and statistical analysis, to extract meaningful insights from experimental and numerical data (SQL, Python).
- Applying strategic thinking and fostering close collaboration with stakeholders and senior leaders across the Hub and CSL Limited, a global biotechnology company.
- Supervise a team of 4 scientists within the Hub, lead weekly meetings, and review progress.

Research Fellow in Computational Data Science October, 2023
University of Melbourne February, 2025

- Led collaborative, industry-funded projects with CSL Limited, focused on 1) numerical bioprocess modeling and 2) hybrid modeling for drug dosing.
- Developed multi-scale Digital Twins of bioreactors, enabling simulation of various operational conditions and significantly reducing the need for physical experimentation (saving tens of thousands of dollars per run). It helped to improve bioprocess performance by up to 30% .
- Optimized a hybrid clot lysis model (CFD + ODEs) after data mining and cleaning (SQL, Python), enabling accurate prediction of optimal drug dosage for vascular clotting patients

PhD Researcher, Project Officer, Tutor August, 2019
The University of Melbourne October, 2023

- Led three digital-oriented projects using advanced CFD simulations, Python scripting, and Linux Bash programming for parallel computing on supercomputers (HPC) to predict vessel stenosis progression and optimize personalized treatment strategies. These projects were conducted in close collaboration with the Royal Children's Hospital and St Vincent's Hospital.
- Developed, implemented interactive course materials for the Fluid Mechanics course that is currently used at the University of Melbourne (PowerPoint, PowerBI).

Data Scientist September, 2017
Skolkovo Institute of Science and Technology, Russia August, 2018

- Enhanced the analytical model of ice formation on transmission lines by integrating literature data and sensor-collected data (Python). The new model is 5% more accurate and was designed for validation in wind tunnel facilities.

Computational Scientist June, 2016
Central Aerohydrodynamic Institute (TsAGI), Russia July, 2017

- Developed a numerical model of a small wind tunnel, allowing nozzle position adjustments without the high costs of experiments (approx. $3k per experiment) under challenging conditions. Also assisted with conducting wind tunnel experiments.

EDUCATION

Doctor of Philosophy, Mechanical Engineering, The University of Melbourne 2019 – 2024
Master of Science, Applied Mathematics, Moscow Institute of Physics and Technology 2015 – 2017

SKILLS

Python (NumPy, Pandas, Matplotlib), Bash, MySQL, AWS (S3, EC2, Lambda), FastAPI, HPC
NLP, LLM (including RAG, MCP)
Machine Learning (Scikit-learn, PyTorch, XGBoost, CatBoost)
Probability and Statistics, Data Sourcing and Preprocessing, Experimental Design and Optimization
CAD, Computational Fluid Dynamics
Excel, PowerPoint, PowerBI, Outlook, Teams, OneDrive, Trello
Analytical Thinking and Problem Solving, Client Engagement
Stakeholder Management, Agile, Excellent Communication and Storytelling
English · proficient, Russian · native

LEADERSHIP

Deputy Chair, Early and Mid-Career Researcher Committee 2024 – 2025
Graeme Clark Institute for Biomedical Engineering