Mariia Timofeeva

Data Scientist

PhD in Engineering with over 3 years of industry experience in Data Science and AI Engineering

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EXPERIENCE

Computational Data Scientist Mar 2025 - Present

ARC Digital Bioprocess Development Hub, CSL Limited

- Developing a hybrid model that integrates a data-driven approach (ML algorithms) with a mechanistic framework to predict the performance of pharmaceutical bioreactors.
- Optimizing cloud-based ETL pipelines by developing API endpoints and SQL queries to enable efficient extraction and delivery of experimental data to stakeholders.(SQL, Python, Databricks).
- Developing a CSL chatbot leveraging RAG to provide context-aware SQL query generation and facilitate interactive data analysis, streamlining experimental workflows and accelerating decision-making.
- Developed a RAG-based system for the 6,000+ page ANSYS user guide, significantly enhancing search efficiency and enabling faster modeling of bioreactor digital twins.
- Applying strategic thinking and fostering close collaboration with stakeholders by leading weekly meetings, and reviewing progress.

Research Fellow in Computational Data Science Oct 2023 - Feb 2025

University of Melbourne

- Developed multi-scale digital twins of bioreactors, reducing reliance on physical experiments and saving tens of thousands of dollars per run; improved bioprocess performance by up to 30% in some cases.
- Optimized a clot lysis mathematical model (SQL, Python), enabling accurate prediction of optimal drug dosage for vascular clotting patients.

PhD Researcher, Project Officer, Tutor Aug 2019 - Oct 2023

The University of Melbourne

- Led three industry-oriented projects using advanced numerical algorithms (Python, Linux Bash, 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 and taught course materials for several courses with a strong applied mathematics component that are currently used at the University of Melbourne (PowerPoint, Power BI).

Data Scientist Sep 2017 - Aug 2018

Skolkovo Institute of Science and Technology, Russia

- Developed a data-driven model of ice formation on transmission lines by integrating literature and sensor-collected data (Matlab, Excel). The challenger model demonstrated 5% higher accuracy during experimental validation in wind tunnel facilities.

Computational Scientist Jun 2016 - Jul 2017

Central Aerohydrodynamic Institute (TsAGI), Russia

- Developed a Computational Fluid Dynamics (CFD) model of a wind tunnel, enabling nozzle position adjustments without the high costs of experiments under challenging conditions. Assisted with aircraft icing experiments by controlling flow velocity in the wind tunnel and managing water injection.

EDUCATION

PhD, Mechanical Engineering, The University of Melbourne 2019 – 2024

Master of Science, Applied Mathematics, Moscow Institute of Physics and Technology 2015 – 2017

Bachelor of Science, Applied Mathematics, Moscow Institute of Physics and Technology 2011 – 2015

SKILLS

- Python (NumPy, Pandas, Matplotlib), Bash, MySQL
- Machine Learning (Scikit-learn, PyTorch, XGBoost), NLP, LLM (including usage of RAG, MCP, ADK)
- Probability and Statistics, Data Sourcing and Preprocessing, Experimental Design and Optimization
- AWS (S3, EC2, Lambda), Docker, FastAPI, HPC
- Excel, PowerPoint, PowerBI, Trello
- Analytical Thinking and Problem Solving, Stakeholder Management, Excellent Communication and Storytelling

VOLUNTEERING

Deputy Chair, Early and Mid-Career Researcher Committee 2024 – 2025

Graeme Clark Institute for Biomedical Engineering