

# Mariana Khachatryan, PhD

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<https://scholar.google.com/citations?user=GFP-ZS8AAAAJ>

Data Scientist with experience in developing and deploying end-to-end machine learning pipelines. Skilled in predictive modeling, quantitative analysis, data visualizations of big data using Python, SQL and C++. I am a trained Data Scientist from The Erdős Institute and a nanodegree holder of Udemy for Deep Learning and Artificial Intelligence.

## SKILLS

- **Languages & Tools:** SQL, Python(Libraries: Numpy, SciPy, Pandas, Matplotlib, Tensorflow, Scikit-learn), Microsoft Power BI (view reports), C/C++, Git, Shell, Latex, SLURM (distributed computing).
- **Machine Learning & AI:** Deep Learning (CNNs, LSTMs, Autoencoders, Transformers), NLP, Supervised & Unsupervised Learning, Statistical Modeling, Time Series Forecasting, LLM Fine Tuning, OpenAI API, Langchain, Building Chatbot, Prompt Engineering.

## EXPERIENCE

- **Erdős Institute Data Science Bootcamp** Columbus, OH  
*Data Science Fellow* Sep. 2024 - Dec. 2024
  - Led a team of PhD researchers in building machine learning models for predicting car price and identifying features driving model prediction using SHAP values. Achieved  $R^2$  of 0.88 from XGBoost, reducing prediction error by  $2\times$ .
  - Communicated findings to stakeholders (CarMax, Upstart); built reproducible codebase in Python with Git.
- **Florida International University (FIU)** Miami, FL  
*Postdoctoral Research Associate* Jan. 2020 - May 2023
  - Used Python, probability and statistics for exploratory data analysis, data engineering and model development for  $\sim 3.9$  PBs particle physics data from GlueX collaboration at Jefferson Lab.
  - Used Least Squares and Maximum Likelihood statistical methods to clean data via Probabilistic Event Weightings. Implemented multivariate classification algorithms in C++ to classify particles. Applied bootstrapping techniques for error estimation. Used distributed computing on computing cluster with 5k nodes. Collaborated with a global team of 300+ scientists to exchange findings, refine data analysis strategies, and improve model accuracy.
  - Participated in collection, monitoring and quality check of  $\sim 1.5$  PBs data.
  - Mentored junior group members. Delivered presentations for technical and non-technical audiences. 40+ publications in peer reviewed journals. Recognized with a Certificate of Appreciation from Executive Dean.
- **Old Dominion University** Norfolk, VA  
*Research Assistant* Jan. 2014 - 2019
  - Utilized MS SQL to process the Jefferson Lab CLAS collaboration (over 200 physicists) large scale data using SLURM distributed computing on Lustre file systems. Used C++ for Monte Carlo simulations, error estimation and prediction of Electron-beam energy reconstruction. Mentored junior researchers. Received recognition and award. Data analysis results published in Nature journal. 3 media appearances ( ODU1, ODU2, JLab).

## SELECTED MACHINE LEARNING AND DEEP LEARNING PROJECTS

- **Car sales price prediction Nov. 2024 GitHub URL:** Predicted car sales price based on various features.
- **Clothing Sales Forecasting Jun. 2025 GitHub URL:** Developed time series forecasting models using LSTM networks and Linear Regression to predict clothing sales trends. Achieved  $2\times$  improvement in model performance using Linear Regression..
- **Large Language Model (LLM) fine tuning, July 2025 GitHub URL:** Fine tuning model from OpenAI API for email classification and serving it with FastAPI.

## RECOGNITION & AWARDS

- **Certificate of Appreciation:** Florida International University Executive Dean (2021)
- **Research Excellence:** Jefferson Science Associates Graduate Fellowship (2018-2019)
- **1st Place Prize:** Jefferson Lab Users Organization Poster Competition (2018)

## EDUCATION

Ph.D. in Experimental Nuclear Physics, Old Dominion University	2019
M.Sc. in Physics, Old Dominion University	2014
M.Sc. in Physics, Yerevan State University	2011-2013
B.Sc. in Physics, Yerevan State University	2007-2011

<sup>0</sup>Languages: **English** (Fluent), **Russian** (Fluent), **Armenian** (Native)