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SHAYAN IRANIPOUR
Curriculum Vitae

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Education

University of Cambridge

- **PhD - Department of Applied Mathematics and Theoretical Physics**   2018-2022
  Deep learning for particle physics. Smith-Knight & Rayleigh-Knight prize.
- **MMath, Mathematics - Distinction**   2017-2018
  Part III of Mathematics Tripos. Specialised in theoretical physics.
- **BA, Natural Sciences - Double 1st**   2014-2017
  Specialised in physics & mathematics in second year and theoretical physics in third year.
  Sidney Sussex academic scholar.

Experience

Xantium Group - Quantitative Researcher   2022-present

- Building statistical models for trading strategies in the financial markets.
- Working with large, noisy datasets to research, develop, deploy, and maintain statistical and ML models as trading signals. Highly experienced in `Python` and data science pipelines. Expertise in time series modelling and statistical methods especially in low signal-to-noise ratio regimes.
- Developed ML research pipelines to facilitate rapid prototyping and ease deployment of production grade models.
- Used `Python` to build robust, reliable, and performant production code throughout the mission critical code path handling daily trading volumes in excess of $1B.
- Researched and developed statistical arbitrage trading system to manage ETF trading handling risk factor hedging, market impact, trading costs, and universe selection. Worked on the position optimizer to determine optimal trading path.

Neural Network Parton Distribution Functions   2018-2022

- Applying ML/deep learning approaches to determine proton structure and search for signals of new physics.
- Software developer and researcher with heavy focus on `Python` implementations of neural network techniques for high energy physics.
- Modernized the code base from legacy `C++` implementations to make use of `Python` frameworks in order to open source the project.
- Published state-of-the-art proton determinations setting a new standard in precision.
- Attended and presented at numerous international conferences to communicate research publications.

Mathematical Tripos Undergraduate Supervisor   2019-2021

Teaching undergraduate courses in Dynamics and Relativity, Differential Equations, and Classical Dynamics (1st and 3rd year students).

Additional Skills

Technologies: Highly experienced with `Python` and scientific computing libraries. Extensively used LaTeX for document production. Good understanding of `SQL`, `Redis`, `YAML`, `Slurm`, `Git/GitHub`, CI/CD, Linux, and `bash`. Familiar with `C/C++`, build systems, `Rust` and cloud services (AWS/GCP).

Libraries: Extensive experience in `NumPy`, `Pandas`, `scikit-learn`, `PyTorch`, `TensorFlow`, `Keras`, `XGBoost`, `Numba`, `matplotlib`, `seaborn`, `plotly`, `xarray`, `dask`, `SciPy`, `NetworkX`, and `SymPy`.

Professional: Experience presenting and communicating research having attended numerous presentations at international academic conferences and internal presentations. Reading, implementing, and publishing research work in academic journals and internal reports. Working with large code bases across various teams and different timezones. Part of the hiring pipeline for developers and researchers.

Hobby projects: `graphexecutor` for executing Python code using a graph based paradigm, with program inputs defined in a `YAML` config. Repo at `https://github.com/siranipour/graphexecutor`

Languages: Fluent in Farsi (Persian) and English (native speaker for both).

Publications

- *A new generation of global simultaneous fits using deep learning.* arXiv: 2201.07240 [hep-ph]. Accepted by Journal of High Energy Physics.

- *The Path to Proton Structure at One-Percent Accuracy* arXiv: 2109.02653 [hep-ph]. Accepted by European Physical Journal C.

- *An open-source machine learning framework for global analyses of parton distributions* arXiv:2109.02671 [hep-ph]. Accepted by European Physical Journal C.

- *Parton distributions in the SMEFT from high-energy Drell-Yan tails* arXiv:2104.02723 [hep-ph]. Accepted by the Journal of High Energy Physics.

- *The Strangest Proton?* arXiv:2009.00014 [hep-ph]. Accepted by the European Physical Journal C.

- *Can New Physics hide inside the proton?* arXiv:1905.05215 [hep-ph]. Accepted by Physical Review Letters.