Othmane Rifki, Ph.D.

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Summary

Data scientist and physicist with **8 years experience** at **CERN** in solving complex problems with **scientific rigor**. Performed advanced statistical analysis of **datasets of hundreds of petabytes** processed with worldwide **distributed cloud computing**. Deployed **real-time filtering** systems to select very rare signals. Applied **optimization** and **machine learning** techniques to high-dimenstional datasets using **deep learning**, **clustering**, and **decision trees**. Maintained **monitoring tools** for detector performance and data quality using **anomaly detection** and **time series** analysis.

Experience

Conseil Européen pour la Recherche Nucléaire (CERN) **Geneva, Switzerland**
Deutsches Elektronen-Synchrotron (DESY) **Hamburg, Germany**
Post-Doctoral Research Fellow, Associate Member *Aug 2016 - Present*

- Helped **refute** one of the most promising hypotheses on the nature of dark matter (85% of the mass of the universe), by analyzing 10 million billion proton collisions in complex and high dimensional data
- Narrowed the search for new particles of supersymmetry by 50% via likelihood-based statistical analyses on petabyte-scale dataset using **predictive modeling algorithms**
- Built **economical** micron-level precision pick-and-place assembly unit using computer vision algorithms to build the next-generation multi-million dollar particle detector; see here a video of the machine at work
- Oversaw the project **expenditure budget** of $300k while coordinating a team of scientists, engineers, and suppliers
- Supervised a team of 10 scientists and rotated on-call responsibility to achieve a **data recording efficiency of 95%**

Argonne National Laboratory (ANL) **Chicago, United States**
Research Fellow *May 2014 - Jul 2016*

- Used **IBM Mira supercomputer** to generate Monte Carlo simulation of millions of complex particles interaction leading to a 1000x speed-up and results used by hundreds of data analyses
- Developed a **real-time filtering** system to process 160 GBPS enabling 3000+ scientists to analyze 20% more proton collision data 400x more efficiently
- Won $30k Analysis Support Center Fellowship awarded to one student a year to work with ANL scientists

Skills

Software: Analyzed and visualized high-value datasets

- **Languages** (10+ years): Python, C/C++/STL
- **Data science** (5+ years): SQL, Numpy, Scipy, Pandas, Keras, Scikit-learn, PyTorch, TensorFlow, OpenCV, Matplotlib
- **General** (5+ years): Matlab, Mathematica, Linux, Bash Scripting, Git, Jira

Leadership: Led several **cross-functional** teams with regular deadlines and quarterly publications

- Organized and chaired regular meetings and delegated tasks with emphasis on individual strengths
- Managed teams of **5-20 researchers** to develop analysis, forecasting, and optimization methods
- Supervised **10 graduate students** with successful thesis defenses

Publication and Presentation: Excelled in verbal and written communication

- Presented findings for stakeholders through **visual displays of quantitative information**
- Authored **complex research work** for general audience; see an example here
- Published in peer-reviewed particle physics and instrumentation journals; see a complete list here
- **Fluent** in English, French, Arabic with basic skills in German

Education

University of Oklahoma (OU) *Ph.D. in High Energy Physics* **Norman, OK, United States**

Drexel University *B.Sc. in Physics with High Honors* **Philadelphia, PA, United States**

Activities

- **Triathlon**: Competed in the Hamburg Landesliga in the 2018 and 2019 seasons
- **Diving**: CMAS 3 star diver with TDI advanced nitrox certification