# Luca Pernie, Ph.D.

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Green Card Holder

## Lead Data Scientist

### Specialized in: Analytic Modeling, Statistical Methods, Machine Learning Techniques

7+ years of experience as highly skilled Data Scientist. Earned a joint Ph.D. in subnuclear physics, contributing to the Nobel prize discovery of the Higgs Boson at the European Center of Nuclear Research (CERN). After leading searches for rare processes, I shifted my interest toward the detection of fraudulent patterns in financial data, joining FICO.
Proven record of predictive modeling, statistical techniques, and data mining algorithms resulted in publications in peer reviewed journals, and presented in several international conferences.
Extremely skilled at project leadership, and at collaboration with multi-cultural and multi-disciplinary teams.

Statistics **I** Data Analysis **I** Machine Learning **I** Modeling **I** Data Visualization **I**
Competing Priority Management **I** Team Coordination **I** Effective Communication

## Professional Experience

**Lead Data Scientist** — **FICO (Fair Isaac Corporation) I** San Diego, CA **I** 2019 - Present

- Redesigned the architectures of Credit & Debit models in order to improve performances, while optimizing memory usage. False Positives reduced by 30%, and Detection Rate increased by 15% (relative values).

**Data Scientist 2**

- Designed an algorithm to detect BIN attacks. BIN attacks are a novel fraudulent technique that involves a known BIN number, and the systematical generation of the remaining numbers of a credit card. This attack is almost invisible to standard detection algorithm that profiles on user behavior.
- Lead the development a model that predict frauds in UK and Irish transactions with debit cards physically present, and that outperform previous models in Detection Rate and False Positives.
- Built a Global Profile Intelligence (GIP) model, that uses deep learning techniques, merchant profiling, and behavioral analytics, to detect frauds on ATM machines in US.

**Postdoctoral Fellow** — **Texas A&M University/CERN I** Texas / Switzerland **I** 2015 - 2019

- Manager of all data analyses activities (~8 teams) which aim to to estimate/predict detector conditions (Alignment, Calibration and Database Co-Manager).
- Coordinator (~10 people) and main developer of two data analyses targeting the detection for extremely rare processes hidden in PB of data through advanced statistical analyses, and machine learning techniques.
- Coordinator (~7 people) and main developer of the 'Muon Alignment Project', which uses a multidimensional regression analysis to estimate the position of ~600 detectors with a precision of ~300 microns.
- Improved by a factor of 2 the precision of the multidimensional regression framework (2017 Achievement Award).
- Developed a deep neural network algorithm which adopts a novel parametric training technique that returns a model which depend on input parameters (>98% accuracy).
- Improved by 30% energy response estimation by deploying a random forest regression to correct for material effects. Created a new framework to gather and analyze data collected by ~100k lead tungstate crystals.

## Technical Proficiencies

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|---|---|
| Languages & Services | Bash; C++; Python; SQL, AWS (familiar) |
| Python Libraries & Frameworks | Keras; NumPy; Pandas; Pyplot; Scikit-learn; Scipy; Tensorflow; PySpark (familiar) |
| Machine learning | BDT; Random Forests; Naive Bayes; Regressions; Deep Neural Network; Latent Dirichlet Allocation; K-means |
| Version Control/Methodologies | GitHub; SVN; Agile (JIRA, Asana) |
| Software Applications | LaTeX; Microsoft Office Excel, PowerPoint, and Word |

## Education

**Doctor of Philosophy (Ph.D.), High Energy Physics** – Université Libre de Bruxelles | Brussels, Belgium; Università di Roma La Sapienza | Rome, Italy

**Master of Science, Particle Physics** – Università di Roma La Sapienza | Rome, Italy

**Bachelor of Science, Physics** – Università di Roma La Sapienza | Rome, Italy

## Publications & Conferences

400+ publications as a member of CMS Collaborations, and multiple international conferences. Full list available here

## Awards

**Outstanding Contribution (MUON Project)** – CMS Achievement Awards | 2017

**Distinguished Postdoctoral Flash Talk** – Postdoctoral Research Symposium | Texas A&M University | 2016

**One-year Grant (~50K CHF) as CERN-INFN associate (A CERN fellow position)** | 2014

## Outreach Activities

**Organizer – Machine Learning Techniques in Science** 3-day seminars for graduate students and postdoctoral researchers

**Organizer – High Energy Physics Experiment Cosmology** A seminar series for members of the experimental and theory communities, including faculty, postdocs, researchers, graduate and undergraduate students of Texas A&M University

**Organizer – A Walk through the Large Hadron Collider** Part of the Physics and Engineering Festival at Texas A&M University

**Guide of the CMS experiment** Tours of the CMS experimental facility in English, Spanish, and Italian