

# Oliver De La Cruz | Data Scientist

📍 13 Jean-Pierre Sauvage – 2514 – Luxembourg • ✉ o.delacruzceballos@gmail.com  
☎ (+352) 691 14 08 89 • 🌐 www.delacruzoliver.com • in oliver-de-la-cruz • 📷 oliverdelacruz

## Education

### Swiss Federal Institute of Technology, ETH Zurich

*Master of Science in Statistics, Data Science*

Honors: Magna Cum Laude, Rank: 3<sup>th</sup>/35

Switzerland

October 2016 – November 2018

### University of Lausanne, HEC Lausanne

*Master of Science in Finance, Financial Engineering and Risk Management*

Exchange Program in U.S: MFE - Claremont Graduate University - Fall 2012

Honors: Cum Laude, Rank: 5<sup>th</sup>/67

Switzerland

September 2011 – September 2013

### University of Luxembourg

*Bachelor of Science in Economics and Management, Econometrics*

Exchange Program in Sweden: B.Sc in Economics - Örebro University - Fall 2010

Honors: Magna Cum Laude, Rank: 3<sup>rd</sup>/88

Luxembourg

September 2008 – September 2011

## Professional Experience

### Amazon EU - Supply Chain Research

*Data Scientist Intern*

October 2017 – February 2018

Conducted a research project on unsupervised machine learning methods to discover patterns for time series data using deep learning algorithms with Tensorflow and cloud computing leading to a cost reduction in inventory placement by 10%.

- Provided technical expertise on RDBMS and administered a columnar petabyte-scale data warehouse in Redshift
- Trained a Deep Embedded Clustering to learn feature representations and cluster assignments for outlier detection
- Sustained product selection by predicting out of-stock events with regularized regression and data mining techniques
- Engineered robust data integration (ETL) pipelines with Spark and plotted the output with Javascript to perform deep dives
- Architected and deployed an service infrastructure utilizing containers and several AWS stack to build large scale applications

Luxembourg

### Ernst & Young - Quantitative Advisory Services

*Senior Quantitative Analyst*

October 2013 – October 2016

Boosted revenues by 2MM through the launch of a cloud business intelligence platform offering digital solutions with interactive data visualization, while expanding the range of valuation services for derivative products using internal models.

- Validated and monitored Value at Risk models for hedge funds and banks across Europe
- Generated ad hoc reports to gain insights on credit risk, factor sensibilities and stress testing
- Developed an end-to-end application in C++ to price convertible bonds by implementing finite difference methods
- Reviewed portfolio management processes and investment strategies to ensure consistency with the client's risk profile
- Performed predictive analytics by integrating statistical methodologies with Python to determine trends in the fund industry
- Established a database to compute the retrocessions fees for a client and programmed in SQL to estimate the profit margins

Luxembourg

### European Investment Bank - Finance Directorate

*Analyst Intern*

February 2013 – July 2013

Improved the automation of the bank's dashboard by creating a web-based software that gathers key statistics and measurable KPIs which led to a cut in half of the time required to assess the market risk held in the trading book.

- Designed hedging and investment strategies to reduce exposure to risk factors using derivatives
- Performed daily market risk analysis of fixed-income securities in line with the executive management's reporting needs
- Identified data quality issues, upgraded business processes and executed cash reconciliation between the front and back office

Luxembourg

### Société Générale - Asset Management & Private Banking

*Summer Intern*

August 2011 – August 2011

Increased the efficiency of data storage with proper indexing, enhanced the in-house information retrieval methods and updated the user interface design, resulting in a 50% increase in usability for non-technical staff members.

- Prepared presentations analyzing major net asset value fluctuations of institutional funds to support investment decision-making
- Created a VBA tool and incorporated stored procedures in MS SQL server in order to facilitate the task of data processing

Luxembourg

### SES Satellite Communications Services - Internal Audit

*Summer Intern*

July 2011 & September 2011

Assisted with the drafting of the annual report delivered to the Board of Directors of the world's second largest satellite operator.

- Overhauled audit procedures and compliance with accounting policies
- Implemented an effective program to monitor crucial metrics and identify red flags regarding financial transactions

Luxembourg

Accelerated the process of market data collection by introducing a web crawler and applied econometrics for efficient portfolio allocation to support future academic research in predictive modelling.

- Conducted periodic backtesting, evaluation and optimization of stock selection models
- Analyzed the financial statements of EU companies and constructed optimal portfolios to beat the Euro Stoxx 50 benchmark

## Languages

---

**Spanish:** Mother tongue (C2)

**French:** Bilingual (C2)

**English:** Fluent (C2)

## Skills

---

**Programming Languages:** Python, R, C++, Scala, Matlab, SQL, JavaScript

**Libraries:** Numpy, Pandas, Scikit-Learn, Tensorflow, Caret, Ggplot2, Plotly

**Big Data:** Hadoop MapReduce, Apache Spark, Hbase, Hive, MongoDB

**Databases:** PostgreSQL, SQL server, MySQL, Redshift, MongoDB

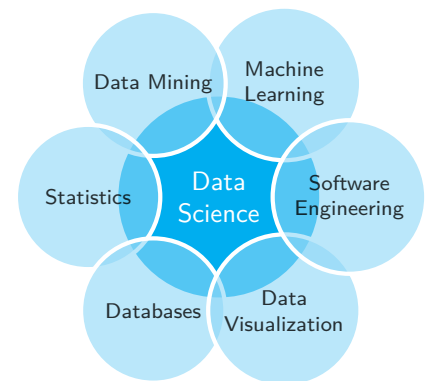
**Web technologies:** HTML, CSS, jQuery, AJAX, XML, JSON

**Frameworks:** Django, React, Angular, Shiny, Bootstrap

**Software Development Tools:** Git, Github, Docker, Tmux

**Operating systems:** Microsoft Windows, Apple Mac OS X, Linux

**AWS:** EC2, S3, VPC, IAM, RDS, ELB, Elastic Beanstalk, CloudFormation



## Research & Projects

---

### Deep Reinforcement Learning for Autonomous Exploration, Master Thesis

**November 2018**

The thesis proposes deep reinforcement learning methods that are able to navigate in complex unknown environments attaining a performance close to human-level intelligence.

- Included auxiliary tasks in the loss function to deal with the sparsity of the rewards and extract meaningful features
- Parallelized policy gradient methods to run in distributed systems using asynchronous optimization with multiple GPUs
- Integrated an external memory which acts as an internal representation of the map

### Conversational Agent, Project

**July 2017**

The task was to build a simple dialogue system that can handle real-world conversations. Starting from a simple Seq2Seq implementation, one needs to identify limitations of the baseline and suggest extensions that tackle specific problems.

- Programmed an local attention and copying mechanism with a LSTM 4-layer neural network
- Applied reinforcement learning to produce better answers

### Sentiment Analysis, Project

**June 2017**

The task was to classify whether a tweet message posted by a user contained a positive or negative smiley by only considering the rest of the text. A multi-step method was developed consisting of preprocessing, word-vector embeddings, and classification using deep learning.

- Parsed sentences to build dependency trees and estimated word embeddings with Word2vec or Glove approaches
- Calibrated a 3-layer convolutional neural network with max pooling and batch-normalization

### Dynamic Factor Models for Asset and Liability Management, Master Thesis

**September 2013**

The paper advocates term structure models which parsimoniously exploits unobserved information with the objective of forecasting interest rates and predicting future bond prices.

- Formulated a Vector autoregression (VAR) model to capture linear interdependencies among multiple time series
- Applied dimensionality reduction techniques to large number of macroeconomic variables
- Developed a Kalman Filter algorithm to estimate the latent yield curve factors

## Activities & Achievements

---

**Leadership:** Organized conferences, presentations and events for the Alternative Summit in Las Vegas (2016)

**Certifications:** Passed CFA Level II (2017)