MIGUEL PEREIRA TORRES DA COSTA

Current Work: PhD Candidate @ University of Trieste
Topic: Machine Learning applied to the design of Atomtronic Circuits
Previous education: First Class Honours BSc and Masters in Mathematics at Oxford University
Date of Birth: 25th July 1995   **Nationality:** Portuguese

SUMMARY

Experienced Data Scientist & Mathematician with a demonstrated history of handling data solutions in fields such as fashion, finance and biotech. Currently applying machine learning to improve the hardware behind quantum sensors and quantum qubits.

CONTACT

Phone: Available on request
Email: miguelptcosta1995@gmail.com
Webpage: https://collapsedwave.com
GitHub: https://github.com/migueltorrescosta

SKILLS

●●●●● Mathematical Modelling	●●●●○ Python	●●○○○ Linux
●●●●○ Machine Learning	●●●○○ Docker	●●●○○ Git
	●●●○○ Keras / Tensorflow	●●●○○ SQL

EXPERIENCE

Software Developer @ Oxford Nano Imaging (December 2021 – December 2023)
- Mantained the backend infrastructure, originally as the solo backend developer, for a data analysis platform, with components in Django, Golang, ElasticSearch, GCP, Kubernetes, DataDog and Rust.

Software Developer @ Amyris Inc. (Feb 2021 – December 2021)
- Solved a long lasting computational bottleneck (calculation time reduced by a factor of 10e4) by familiarizing myself with the inner workings of State of the Art SAT Solvers, planning the required adaptations for our use case and adding them back to the library Sympy for ease of use without the burden of maintenance: https://github.com/sympy/sympy/pull/21510
- Full stack development with React, Django, JWT, Gitlab CI/CD, Pylon's / Pyramid, OpenAPI.

Founder @ QuestPowered (Jun 2020 – Dec 2021)
- Built a forecasting platform over 6 weeks, including KPIs for measuring forecasting ability under random outcomes based on concepts from Information Theory and Measure Theory.
- Self taught Django as a website development platform.
- Setup a custom domain and server for delivering the product.

Portfolio Risk Analyst @ BlackRock's Financial Modeling Group, Budapest (Sept 2018 – Jun 2020)
- Expanded a US specific dividend forecast model to 18 countries, providing near global coverage based on wealth allocation.
- Explained statistical anomalies on live market data under daily deadlines, delivering reports to our clients.
- In a team of 5, implemented a novel and experimental risk analysis methodology in a week as part of an hackathon project and presented it to a Regional committee, getting 2nd place within Blackrock EMEA.

Teacher @ CamExpress Summer Programme, Shanghai (Jul 2018 – Aug 2018)
- Developed lesson plans for classes ranging between 8 and 41 students.
- Prepared assessment materials aimed at ranking the students' performance.
- Was rewarded monetary prizes based on my performance as a teacher and the contribution of new materials

Data Scientist @ Farfetch, Porto (Jul 2017 – Dec 2017)
- Improved the performance of Farfetch's Product Ranking Algorithms, following the team's agile methodology.
- Connected the development cycle from initial business need, to software development, internal testing and user testing.
- Collaborated in the setup of a automatic clothing identifier using Python's Keras package.

Mathematics Tutoring (2017 – Present)
- Students' age range between 10 and 34 years old.
- Swiftly adapted my domain knowledge to the students background in order to make the most of the tutorial sessions.
- More details found at https://universitytutor.com/tutors/944174

Number Theory Researcher @ Oxford University (Jun 2016 – Jul 2016)
- Learnt the basics of Elliptic Curves during a 1 week crash course with Dr Jennifer Balakrishnan.
- Adapted algorithms by William A. Stein in order to efficiently populate databases of Elliptic Curves, running these algorithms using Google Cloud while keeping running costs to a minimum.

Data Scientist Summer Intern at Farfetch, Porto (Jul 2015 – Aug 2015)
- Built an internal Fraud Detection System at Farfetch.
- Self taught Machine Learning in Python, R and SQL on the job
- The foundational code was built over the span of a 7 week internship.
- The associated publication was cited over 180 times: https://doi.org/10.1016/j.dss.2017.01.002

Casino Croupier @ Oxford's Raise and Give (2014 – 2016)
- Raise and Give (RAG) is a charity which aims to raise money and donate it to other institutions in greater need.
- I performed quick mental arithmetic in order to split pots appropriately, while maintaining a formal posture during the occasional presence of tipsy players.

EDUCATION

PhD Candidate @ University of Trieste (December 2023 – Present)
Focused on the application of Machine Learning methods to Quantum Systems.
The topics covered include:

Modern experiments in quantum optics and quantum information	Complete Positivity and Quantum Information
Decoherence in Open Quantum Systems	Statistical Field Theory
Quantum Error Correction	Bayesian Statistics
Advanced Topics in Quantum Field Theory	Lie Algebras

Integrated Masters in Mathematics @ Oxford University (October 2013 – June 2016)
First Class Honours (Parts A/B) and Upper Second Class (Part C)
Subjects taken:

Groups and Group Actions	Analysis	Metric Spaces and Complex Analysis
Linear Algebra	Differential Equations	Design and Analysis of Algorithms
Rings and Modules	Probability	Functional Programming (Haskell)
Number Theory	Integration	Imperative Programming (Scala)
Graph Theory	Topology	Information Theory
Projective Geometry	Topology and Groups	Martingales Through Measure Theory
Banach Spaces	Algebraic Curves	Continuous Martingales & Stochastic Calculus
Hilbert Spaces	Algebraic Number Theory	

High School – Grande Colégio Universal (October 2005 - June 2013)
Final Grade: 19.2 / 20

MISCELLANEOUS

Information Pricing Jupyter Notebook
In the age of KPIs, some of the more humane traits are arguably non measurable, such as affection. Hubbard convincingly argues in his book "How to Measure Anything" that anything can be measured, and a framework for pricing information / new measurements. I've built a Python implementation of his ideas here:
https://colab.research.google.com/github/migueltorrescosta/tutor/blob/master/ExpectedOpportunityLoss.ipynb

G–Research Algorithmic Trading Competition (Nov 2014)
Developed an high frequency trading algorithm for a simulated stock exchange based exclusively on the order book.
Got 1st Prize

LIYSF Participant - London International Youth Science Forum (Jul 2014 – Aug 2014)
Entry fully funded by the Calouste Gulbenkian Foundation, awarded based math Olympiad performance.
LIYSF aims to expose young students to the world of STEM across national barriers and continents.

Math Olympian as a member of Delfos Project (2010 – 2013)
Represented Portugal due to my performance at the National Math Olympiads and Delfos' selection exams. Achieved a total of 3 Bronze Medals, 3 Silver Medals and 2 Gold Medals (see below)

Hands on Particles
Attended Masterclasses on Particle Physics Organized by the European Particle Physics Outreach Group

OLYMPIADS

May 2009	Silver Medal @	**Portuguese National Chemistry Olympiad**
November 2010	Bronze Medal @	**Paulista Math Olympiad (Portugal & Brazil)**
March 2012	Gold Medal @	**Portuguese National Math Olympiad**
July 2012	Silver Medal @	**Portuguese Speaking Countries Math Olympiad**
November 2012	Silver Medal @	**Paulista Math Olympiad (Portugal & Brazil)**
March 2013	Bronze Medal @	**Portuguese National Math Olympiad**
August 2013	Gold Medal @	**Portuguese Speaking Countries Math Olympiad**
September 2013	Bronze Medal @	**Ibero-American Math Olympiad**