

# TOMAS PEREIRA DE VASCONCELOS

"The good life is inspired by love and guided by knowledge"

— Bertrand Russell

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## The Ambitious

- An (aspiring) grandmaster of the [Data Science Lifecycle](#).

## The Professional

- I help teams and companies deliver value-driven solutions to data science problems, **fast!**
- I have hands-on experience in **solving real business-problems** using techniques from descriptive analytics, Bayesian inference, time series forecasting, recommender systems, reinforcement learning, and many others.

## The Academic

- In 2017, I graduated from Royal Holloway University of London with a First Class Honours degree in Physics, followed by the Mathematics graduate degree at King's College London.
- During these years, I also developed some research experience in computational fluid dynamics and contributed to a publication in the field of theoretical statistical mechanics.

## Experience

**Tiqets** / Machine Learning Engineer / Amsterdam, Netherlands / Jan 2019 - Present

As a Machine Learning Engineer, I am part of **Tiqets'** core Data Team. I work closely with data and business analysts, data engineers, as well as product owners and management team. I apply software development, data analytics, and machine learning to scale and operationalise statistical models and make the whole organisation more data-driven.

### Time Series Forecasting

Operationalised sales forecasting by building a general and automated pipeline for pre-processing, model selection, evaluation, and periodic updating of forecasted values. Any of these *jobs* are distributed across [Celery](#) workers running on pods in our Kubernetes cluster. Forecasted values are then exposed to our [DWH](#) and can be visualised in our [BI tool](#). We used [DataDog](#) for monitoring. FYI: for the most part, [LSTM](#) neural networks did not yield better results than classic approaches such as ARIMA and Exponential Smoothing, while an optimised [Prophet](#) model performed best.

### Recommender System

Improved recommendations across our platform by taking user-preference and item-similarity into account. Also enriched popularity-based heuristics for cold-start instances by taking distance and recency into account. A curated version of an [Amazon Personalize](#) model now powers great part of recommendations at Tiqets. To help the Data Team iterate faster and with greater confidence on new versions of the recommender models, we also implemented a time-dependent offline evaluation pipeline for recommender systems, curated for the e-commerce setting.

### Learning to Rank with Reinforcement Learning

To optimise any ranked list on our platform, I initially framed this task as a Supervised Machine-Learned Ranking problem, which involved comparing the predicted ranking to some *ideal* ranking using a metric such as [nDCG](#). To improve on this iteration, I implemented Bayesian Reinforcement Learning to Rank [bandit](#) strategies (e.g. [Thompson sampling](#)), which use *explore and exploit* to continuously learn and improve the rankings. As new data is collected through our event-pipeline, we use [Airflow](#) to frequently update the rankings (e.g. by re-sampling from the updated posterior distribution).



## Leadership / Management / Soft Skills

- Provided guidance and supervision to two University students working on their Masters Thesis. Both students finished with outstanding grades (8/10 and 8.5/10).
- Integrated ideas from methodologies such as CRISP-DM to bring structure to the Data Science project lifecycle. Helped creating and prioritising the Data Science backlog, as well as making weekly meetings more fruitful and actionable.
- Helped management (CEO, COO, and CTO) in brainstorming sessions, ad-hoc analysis, and reporting.
- Lead several company-wide trainings in general analytical competency and advanced BI (Looker) practice.
- The Data Crew at Tiqets grew from 3 to 15 people since I joined. I helped with the recruiting, assessing, and interviewing of candidates as well as organising and attending career fairs.

## Accelogress / Machine Learning Engineer / Guildford, UK / Jun 2016 - Mar 2018

As a Machine Learning Engineer, I worked directly with the CEO and Lead Developer at Accelogress Ltd, a software consultancy company developing solutions using machine learning and API technologies. For the Save-a-Space project, I lead the development of (1) the forecasting engine for car park availability - using a robust machine learning framework - and (2) the pre-processing engine and REST API to expose historical, real-time, and forecasted availability for multiple car-parks around the UK, to our mobile app and web dashboard.

**Technologies:** Docker, nginx, Unicorn, Django REST Framework, AngularJS, scikit-learn, MySQL

## Publications



*"The second virial coefficient of bounded Mie potentials"* - The Journal of Chemical Physics 147, 214504 (2017)

This work is concerned with, for the first time, the derivation of analytic expressions for the second virial coefficient of bounded Mie potentials. We also investigated the convergence properties of the series expansions and considerations of parameters which give rise to thermodynamic stability.

## Education

### Graduate - Mathematics / King's College London, UK / Sep 2017 - Aug 2018

- Developed a robust mathematical foundation for further studies and research in theoretical physics.
- Refined my mathematical intuition to interpret and build models for simple and complex systems.
- The skills acquired are highly transferable to other fields of applied mathematics and statistics.

### Bachelor of Science - Physics / Royal Holloway, Uni. of London, UK / Sep 2013 - Jun 2017 / First Class Honours

- Developed the intuition to identify relevant laws and principles and apply appropriate mathematical tools and approximations when working on complex problems.
- Exposed to advanced experimental methods in collection of experimental data, evaluating its significance, drawing relevant conclusions, and calculating the significant statistics.
- Developed several scientific computing projects with a focus on data analysis and fluid dynamics.
- Experience in communicating experimental results and producing clear and accurate reports.

### High School - Exchange Year / River Ridge High School, USA / Aug 2011 - May 2012 / 93% GPA

- Took part in a one-year exchange program on my last year of high-school.
- Top grades for mathematics, physics, and chemistry with scores ranging between 95% and 100%.

### High School - Science Track / Salesianos de Manique, Portugal / Sep 2008 - Jun 2011 / 80% GPA

- Ranked in the 97th percentile for the Physics & Chemistry national exam.