# Philippe Sabella-Garnier

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## Education

**PhD** **University of British Columbia**, Physics 2011 – 2016
- **Thesis:** Geometry from quantum mechanics
- Was awarded an FRQNT Doctoral Scholarship (value: $60,000) by the government of Quebec.

**BSc** **McGill University**, Mathematics and Physics 2008 – 2011
- First-Class Honours, with Distinction.

## Professional Experience

**Teck Resources** Vancouver, BC
Senior Data Scientist 09/2024 – Present
Data Scientist III 05/2022 – 08/2024
Data Scientist II 01/2021 – 04/2022
- Developed a unified, enterprise-wide optimization product to increase throughput and yield of processing plants using machine learning applied to IoT time series data.
  - Translated overall business objective into multi-objective optimization of competing KPIs.
  - Supported three junior data scientists in modelling KPIs using XGBoost and regularized linear regression, developing custom performance metrics.
  - Designed and implemented optimization algorithm based on differential evolution to find model feature values that would solve optimization problem while respecting business constraints.
  - Acted as the data science contact for defining production architecture and data engineering requirements.
- Led team that created a methodology to accurately assess the impact of both analytics and physical initiatives on plant performance when off-the-shelf models proved inadequate, mentoring two junior data scientists.
- Built a solution to monitor contents of clean coal silos and optimize blending of silo outputs to achieve target specifications.
- Conducted advanced exploratory data analysis in collaboration with subject matter experts to identify causes of unexpected plant downtime.

**Leiden University** Leiden, Netherlands
Postdoctoral Researcher, Theoretical Physics 09/2016 – 08/2020
- Investigated applications of quantum information theory and statistical mechanics to string theory.
- Supervised two graduate students and managed a weekly seminar series.
- Was awarded an NSERC Postdoctoral Fellowship (value: $90,000) by the government of Canada.

## Skill Highlights

**Python:** NumPy, Pandas, Scikit-Learn, XGBoost, Tensorflow, PySpark

**Computing and Infrastructure:** Azure (functions, CosmosDB, Synapse, ADX), GCP (BigQuery), Git, Databricks

**Mathematical Algorithms:** Classical Supervised Machine Learning, Principal Component Analysis, Neural Networks (CNN, RNN), Evolutionary Algorithms, Quantum Computing, Hypothesis Testing

## Personal Projects

### Postdoc Application Success in High-Energy Physics
- Collected postdoctoral applicant identity and self-reported outcomes to aggregate publication statistics from online records, separating applicants into two classes with an XGBoost model.

### Cryptanalysis of simple substitution ciphers
- Decrypted texts as a benchmark for various machine learning and optimization algorithms and coding techniques.