Philippe Sabella-Garnier, PhD

philippe.sg@gmail.com
psabellagarnier.github.io
psabellagarnier
(236) 335-4340
Vancouver, BC
p-sabella-garnier

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher, Theoretical Physics

Leiden University

09/2016 – 08/2020 — Leiden, Netherlands

- Investigated applications of quantum information theory and statistical mechanics to string theory; presented results in five publications and at multiple international conferences.
- Analyzed 100GB of data by studying fine-grained statistical correlations, using linear regression on engineered features and creating meaningful visualizations.
- Supervised two graduate students and managed a weekly seminar series.

Graduate Researcher, Theoretical Physics

University of British Columbia

09/2011 – 08/2016 — Vancouver, BC, Canada

- Researched the applications of quantum information to string theory and noncommutative geometry, leading to results presented in four publications.
- Implemented and modified statistical algorithms in Python to study spatial and temporal correlations of quantum information in different physical models.

Teaching Assistant Training Coordinator

University of British Columbia

09/2012 – 05/2016 — Vancouver, BC, Canada

- As part of a four-person team, developed and implemented an 8-hour training workshop for approximately 30 new TAs per year.
- Managed a team of six mentors to support new TAs.
- Designed and analyzed surveys to assess and revise elements of the training program and justify continued funding.

RECENT PROJECTS

T-Cell receptor repertoire and transplant survival

Girihlet

- Built a Plotly-Dash tool for a small biotech company to detect organ transplant rejection using their immune system sequencing technology.
- Processed 6.5 million rows of data in Python, engineered features and conducted preliminary statistical analysis.
- Designed dashboard to be easily expandable and deployed it on server.

Postdoc application success in high-energy physics

- Gathered postdoctoral applicant identity and self-reported outcomes to aggregate publication statistics from online records.
- Classified applicants as doctoral students or postdocs using an XGBoost-based model, leading to 90.6 % accuracy on test set.
- Accessed 600MB of data from online sources and a custom-built AWS MySQL database, cleaned and processed it with Python (with pandas and scikit-learn).

Cryptanalysis of simple substitution ciphers

- Decrypted texts as a benchmark for various machine learning algorithms and coding techniques, using Python with Tensorflow (Keras).
- Found decryption keys with a genetic algorithm, with fitness given by either a neural network or classical statistics.
- Directly translated text using a one-dimensional CNN or an encoder-decoder model with LSTM units.

SKILLS

Python

NumPy · Scikit-learn · Tensorflow · Pandas · Plotly · PySpark

Other Programming

SQL · Git · Matlab · LaTeX

Machine Learning

Regression · SVM · Decision trees · NLP · Neural Networks (CNN, RNN) · Ensemble methods · Clustering · PCA

EDUCATION

Data Science Fellowship

The Data Incubator

Practical applications, including web scraping, data wrangling and distributed computing.

09/2020 – 11/2020

PhD, Physics

University of British Columbia

Thesis:
"Geometry from quantum mechanics"

2011 – 2016 — Vancouver, BC, Canada

BSc, Mathematics and Physics

McGill University

First Class Honours, with Distinction

2008 – 2011 — Montréal, QC, Canada

AWARDS

NSERC Postdoctoral Fellowship

National, based on research ability as well as communication and interpersonal skills.
Total value: $90,000

2018–2020

FRQNT Doctoral Scholarship

Provincial, based on academic excellence, research potential and communication skills.
Total value: $60,000

2013–2016

UBC 3-Minute Thesis Semi-Finalist

Competition to present doctoral thesis in under three minutes to a non-specialist audience

2016