

Philippe Sabella-Garnier, PhD

@ philippe.sg@gmail.com
in p-sabella-garnier
psabellagarnier

+31 06 42 52 80 60
Leiden, Netherlands

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher, Theoretical Physics

Leiden University

09/2016 – 08/2020 Leiden, Netherlands

- Research focused on the intersection of quantum information theory and statistical mechanics.
- Results presented in five publications (three accepted and two currently undergoing review) and multiple international conferences.
- Approx. 100GB of simulation data produced and analyzed.
- Use of regression, study of statistical correlations to answer field-specific questions.
- Worked on some projects independently and on others leading graduate students.

Graduate Researcher, Theoretical Physics

University of British Columbia

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

- Research focused on string theory and quantum information, with results presented in four peer-reviewed publications.
- Numerical work included linear algebra calculations and regression with Python, visualizations of results.
- Worked in collaboration with other graduate students under the supervision of senior scientists.

Teaching Assistant and TA Training Coordinator

University of British Columbia

09/2011 – 05/2016 Vancouver, BC, Canada

- As a TA, led tutorial and lab sections with audiences ranging from large first-year general requirement classes to small graduate groups.
- Part of a 4-person team which developed and implemented a training program for approx. 30 new TAs per year.
- Managed a team of mentors and took part in delivering an 8-hour workshop.
- Helped design and analyze surveys to assess and revise elements of the training program and justify continued funding of over \$40 000/year.

RECENT PERSONAL PROJECTS

Analysis of postdoc application success in high-energy physics

- Used self-reported identity and outcomes of applicants to build profiles based on analysis of publication records obtained online.
- Applicants separated into PhD students and postdocs by an XGBoost classifier with 90.6% accuracy on test set.
- Data accessed through web API calls and a custom-built MySQL database (run on AWS, approx. 600 MB), cleaned and processed in Python.
- Visualization of data with plotly: <http://lorentz.leidenuniv.nl/~garnier>

Cryptanalysis of simple substitution ciphers

- Breaking classical substitution ciphers to experiment with various ML techniques and coding practices:
 - Genetic algorithm. Fitness of keys defined by frequency analysis evaluated by either a fully-connected neural network or classical statistics
 - Direct translation by 1D CNN and encoder-decoder model using LSTM units.
- Implementation in Python with Keras.

SKILLS

Technical tools

Python Scikit-learn Keras Pandas
Plotly Matplotlib MySQL Git
Mathematica Matlab \LaTeX

Concepts

Neural Networks (incl. CNN, RNN)
Linear and Logistic Regression SVM
Decision trees Ensemble methods
Clustering PCA

EDUCATION

Deep Learning Specialization

deeplearning.ai on Coursera

2020

Ph.D in Physics

University of British Columbia

Thesis:

"Geometry from quantum mechanics"

2011 – 2016 Vancouver, BC, Canada

B.Sc. in 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.
\$45k/year

2018–2020

FRQNT Doctoral Scholarship

Provincial, based on academic excellence, research potential and communication skills.
\$20k/year

2013–2016

UBC 3-Minute Thesis Semi-Finalist

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

2016