Richard Bergna

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EDUCATION

University of Cambridge — **October 2024 - October 2027**
PhD, Probabilistic Machine Learning — Cambridge, UK
Researching scalable probabilistic deep learning models to quantify uncertainty
Under the supervision **Prof. Jose Miguel Hernandez-Lobato** and **Prof. Pietro Liò** in the **CBL Lab**

University of Cambridge — **October 2022 - August 2023**
MPhil Machine Learning and Machine Intelligence - **Grade: 74%** — Cambridge, UK
Dissertation Grade: 84% - **Second-highest** grade of the cohort
Full academic scholarship - Andrew Blake Foundation

University of Bristol — **September 2018 - June 2021**
BEng in Engineering Mathematics - First-Class Honours with **(Ranked 3/∼100)** — Bristol, UK
Dissertation Grade: 81% - **highest** grade of the cohort

COMMERCIAL EXPERIENCE

Quantitative Researcher — April 2024 - Present
Qube Research & Technologies — London, UK

- Applied machine learning and mathematical models for predicting future returns.

Machine Learning Research Assistant — November 2023 - April 2024
University of Cambridge — Cambridge, UK

- Investigating uncertainty quantification methods in graph neural networks.
- Working in the **Computational and Biological Learning Lab**, under the supervision **Prof. Jose Miguel Hernandez-Lobato** and **Prof. Pietro Liò** at the Department of Engineering.

Data Scientist — September 2021 - October 2022
Sopra Steria — Bristol, UK

- Implemented ML algorithms in production; lead ETL transformations in Python.
- Discovered patterns using statistical & machine learning techniques, working with deep learning architectures: CNN, RNN, BNN, Transformers, and boosting algorithms such as GBM, XGBoost, and LightGBM.
- Orchestrated data ingestion to warehouses and improved data acquisition via web scraping.

Machine Learning Researcher — June 2021 - August 2021
University of Bristol, Research Internship — Bristol, UK

- Collaborated with Dr. Kacper Sokol on a publication for the ACM FAccT Conference.
- Innovated ML explainability algorithms; worked with LIME, ANCHORS, and discretization methods.

App Developer — June 2020 – September 2020
Alphard Technology — Remote

- Contributed to version control with Git; managed AWS Cloud; integrated AppSync with React Native apps. Programmed in javascript.

ACADEMIC EXPERIENCE AT CAMBRIDGE

Currently Studying — University of Cambridge
This master is heavily focused on **probabilistic machine learning** methods. Some of the content we have covered includes Bayesian Statistical inference, Gaussian Processes, Probabilistic Ranking (TrueSkill), MCMC, Gibbs sampling, Latent Dirichlet Allocation, Expectation Maximum (EM) using ELBOW, Gilbert spaces, Measure Theory, etc.

Dissertation
Working in Uncertainty Quantification in Graph Neural Networks with a focus on Stochastic Differential equations.

- **Publication titled "Graph Neural Stochastic Differential Equations"** for the "International Conference on Machine Learning (ICML)" **conference**.
- Collaborating under the **supervision** of renowned scholars: **Prof. Jose Miguel Hernandez-Lobato and Prof. Pietro Liò**.

Units Selected

- Introduction to Machine Learning; Speech and Language Recognition; Deep Learning and Structured Data; Probabilistic Machine Learning; Computer Vision; Advanced Speech Recognition; Neural Machine Translation and Dialogue Systems; Spoken Language Generation and Processing; Advanced Machine Learning; Computational Statistics and Machine Learning.

ACADEMIC EXPERIENCE AT BRISTOL

Mathematical and Data Modeling 3 - Dissertation University of Bristol - 30 credits

- Dissertation **recommended for publication** by the Engineering Mathematics department.
- Achieved the **highest grade of the year**.
- Supervised by **Prof. Eddie Wilson** and of **Prof. Hermes Gadelha**.
- Combined multiple unsupervised machine learning algorithms to predict the movement of sperm.
- Worked with Multiple Linear Regression, k-Means, DBSCAN and HDBSCAN algorithms.

Introduction to Artificial Intelligence University of Bristol - 20 credits

- Achieved the **highest grade of the year**.
- Supervised by **Dr. Ryan McConville**.
- Implemented multiple supervised machine learning algorithms to predict the Premier League results.
- Achieved 62% accuracy on unseen data.
- Worked with Optuna library for hyperparameter tuning.
- Worked with XGBoost, Tree, Gaussian Naive Bayesian, Deep Neural Network and Bayesian Neural Network.
- Ensembled all the algorithms with a Bayesian Neural Network.

Applied Data Science University of Bristol - 20 credits

- Top 3 of the year.
- Worked with machine learning computer vision algorithms.
- Built a Convolutional Neural Network algorithm to display similar products to the ones the customers are searching, with the TensorFlow library.
- Implemented resnet (ResNet-50) for feature extraction of the images (embeddings) and triplet loss function to train the resnet on the dataset. in **python**
- Trained the model using BlueCrystal Bristol University supercomputer.

PUBLICATIONS

1 **Richard Bergna**, Felix Opolka, Pietro Liò, Jose Miguel Hernandez-Lobato. “Graph Neural Stochastic Differential Equations.” In preparation for submission to the International Conference on Machine Learning (ICML).

TECHNICAL SKILLS

Programming Languages

- Advanced in Python
- Intermediate in MATLAB and JavaScript
- Novice in C, Java and SQL

Languages

- Bilingual in English and Spanish
- Proficient in Italian

Python Libraries & Software

- Worked in LaTeX, Jupyter Notebook, Visual Studios and Pycharm
- Experienced with Pytorch, TensorFlow, NLTK4, Numpy, Pandas, Scikit-Learn and Optuna

Hobbies

- Salsa, and Bachata Societies
- Gym 4-6 times a week.