

# Raphael Poulain

PHD STUDENT IN COMPUTER SCIENCE

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## Research Interests

Applied Machine Learning, Artificial Intelligence, Health Data Science, Deep Learning, Electronic Health Records

## Education

### University of Delaware

PH.D. IN COMPUTER SCIENCE

Newark, DE

2020 - Present

### EFREI Paris

M.S. IN ENGINEERING

Villejuif, France

2018 - 2020

### EFREI Paris

B.S. IN ENGINEERING

Villejuif, France

2015 - 2020

## Research Experience

### healthy lAlfe Lab, University of Delaware

Newark, DE

PHD STUDENT

Sep. 2020 - Present

- Utilizing Transformers and Electronic Health Records to perform a multi-target regression for primordial prevention of cardiovascular disease.
- Leveraging a BERT-based architecture to extract the bidirectional representation of patients' medical data by defining medical codes as words, visits as sentences, and the medical history as a document.
- Coupled the transformer architecture with another deep neural network using four main EHR modalities: demographics, conditions, prescriptions, and lab measurements.
- Implementation of a single RNN and GAN-based model to predict obesity status at different time-points in the future.
- Participating in the BARDA Pediatric COVID-19 Data Challenge (Ongoing).

## Teaching Experience

### CISC106, University of Delaware

Newark, DE

TEACHING ASSISTANT

Fall 20 - Fall 21

## Work Experience

### Euronext

Paris, France

SOFTWARE ENGINEER INTERN

Mar. 2020 - Aug. 2019

- Built an automated API testing tool using Python and Cucumber during the development of the company's new on-demand market data platform.
- Participated actively in the choice of the technologies and tools used throughout the project.
- Organized the deployment of the tool to serve as the company's main testing engine for newly developed APIs.

### Euronext

Paris, France

SOFTWARE ENGINEER INTERN

Apr. 2019 - Sep. 2019

- Built a cartography tool of the Optiq Trading system that allow engineers to better visualize the architecture of the system.
- Designed the Graph Database Model from the choice of the technology to the model itself.
- Realized a WebApp using JavaScript to keep the database up-to-date automatically and to help visualize each connection between Optiq's components.

## Publications

### PEER REVIEWED CONFERENCE PAPERS

M. Gupta, **R. Poulain**, TL. T. Phan, H. T. Bunnell and R. Beheshti. "Flexible-window Predictions on Electronic Health Records". The Thirty-Fourth Annual Conference on Innovative Applications of Artificial Intelligence (IAAI), 2022. [Link](#)

**R. Poulain**, M. Gupta, R. Foraker, and R. Beheshti. "Transformer-based Multi-target Regression on Electronic Health Records for Primordial Prevention of Cardiovascular Disease". 2021 IEEE International Conference on Bioinformatics and Biomedicine (BIBM), 2021. [Link](#)

## Services & Activities

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**Conference Volunteer**    IEEE International Conference on Bioinformatics and Biomedicine 2021

## Projects

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### Portfolio Optimization

2020

Portfolio creation following the Markowitz's Optimal Portfolio using the predicted returns of an LSTM-based network.

### NHL Players' salaries Prediction

2018

Developed a Random Forest Regression model to predict NHL Players' salaries given their in-game statistics and personal information.

### Self Driving Cars

2018

Programmed a parking lot simulation populated by autonomous cars to teach them how to park using a genetic algorithm.

## Relevant Coursework

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### University of Delaware

Artificial Intelligence, Bioinformatics, Introduction to Data Mining, Advanced Algorithms, Game Theory, Theory of Computation

### EFREI Paris

Numerical Analysis Applied to Finance, Financial Risk, Econometrics, Big Data for Finance, Advanced Databases, Deep Learning and Applications

## Skills and Certifications

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### Programming

Python, R, Keras, PyTorch, Tensorflow, SQL, C / C++, Java

### Machine Learning

Neural Networks, RNN, Transformers, CNN, GNN

### Certifications

Coursera Deep Learning Specialization