



## Global Markets



**BNP Paribas Corporate & Institutional Banking (CIB)** is a leading European investment bank with global leadership in many of our businesses. We are part of the BNP Paribas Group, a financial institution with solid foundations and a proven ability to adapt to change. If you are thinking about a career in investment banking, there is no better place to begin your journey than with BNP Paribas CIB. With nearly 20,000 employees in over 50 countries, we can offer you an exciting start to your career.

**Global Markets** is BNP Paribas' capital markets business, delivering investment solutions across a wide range of asset classes and industry-leading services. As world leader in derivatives, BNP Paribas Global Markets offers clients tailored products, state-of-the-art trading, processing systems, research and strategic advising from its teams of experts, while also maintaining a sustainable economic model.

### Our Data and Artificial Intelligence Lab is Looking for interns !

#### **Client Intelligence Internship:**

Prediction / Recommendation model:

The goal of the internship is to try to anticipate which product a given client is likely to be interested in, leveraging all the information we have on a client: this can be his historical transaction record, the information we have captured on his preference through his chats or phone conversation with Sales, the market levels, or any external data we may have on the client. The challenge comes from two angles: when looking at a given Client on a given product, the data is very sparse and not sufficient, so we have to leverage cross-sectional information to get a stable model. Some clients may be dynamically clustered together to get statistical relevance.

#### **Pattern Detection:**

The goal is to be able to detect patterns in Clients trading history, based on the various products they trade, at which frequency, given which Market conditions, for which size and which directions, and much more. Different trading profile should be identified through clustering techniques and each Client assigned to one of this profile. Eventually we will monitor each Client and alert the Sales if one Client is likely to take an action based on what we see from his peers recent activity, or when he is moving away from his cluster.

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Should you have any questions, please contact: [gm.peopledev@bnpparibas.com](mailto:gm.peopledev@bnpparibas.com)

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### **Chat Bot internship:**

A chatbot needs to understand what the user is writing, but needs as well to remember and adapt the response given the past information.

Your role will be to build a knowledge graph that will grow with each interaction with the user in order to improve the Bots response.

The challenge mixes Natural language processing, Knowledge graphs and Workflows in order to build a fluid interaction.

### **Alternative Data internship:**

The goal is to improve the prediction model we have on the future client activity by leveraging new sources of data. The various data we may try will be the News, the Social Media activity, or any other source of data we may scrap on the Web related to the Client, its competitor or the underlying activity of the Client, the Social Media feeds related. The challenge will be to find the right way to extract structured information from those source of data, mostly through NLP techniques, in a way which could be used by our Client Intelligence Model.

### **Quantitative Investment Strategies:**

The Bank is offering to our Clients some quantitative investment strategies, based on Deep Learning Algorithms. The algorithm may play some classical market signals like momentum or mean-reversion on various assets like Equities, Commodities, FX or Bonds. The goal is to improve the current algorithm through recurrent Network to deliver a higher performance (Sharp Ratio). We may investigate to add some new type of information based on Market Sentiment coming from News or Social Media, or any other potential source of data related to those underlying.

### **Conduct Trade Behaviour:**

The goal is to monitor the trading activity (transactions, request, chats, phone conversation) to detect abnormal patterns in the data

### **Neural machine transcription:**

The goal is to build the next generation of machine transcription to translate chat data into machine readable information. Indeed a great part of the interaction between Clients and Bank's Sales is happening through voice or chat channels. This information is highly valuable to understand better what our clients are after and offer them a better service.

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*In collaboration with Paris Equity Quantitative Research:*

### **Pattern and market dislocation analysis for Volatility Trading**

Volatility market is more and more digital nowadays. This leads to incremental needs to design data science tools to analyze market flow dynamic. One of the major challenge to tackle is to build data structure and digital signal that encompass the non-arbitrage consistency between vanilla prices which lead to structural correlation across strikes and maturities and to design adapted pattern detections on the ad-hoc structure. Moreover, the coexistence of an electronic market and a broker market (on voice but for much larger size) cause temporary market dislocations that have to be detected and reported quickly to Trading. Due to the incremental digitalization of the volatility market, it is key for both market-making and structured Trading to scrutinize what is happening on the volatility market and adapt their pricing and hedging strategy to the current situation. The intern will have to work closely with Trading to better understand their problematics and the key elements to implement the right pattern detections tool.

### **Decision-making Bot for Structured Investment**

The project is to provide a tool to help clients with the structuration of equity derivatives – directly on our dedicated web platform 'Smart Derivatives'. Structured products encompass many features and parameters which are not necessarily easy for a client to navigate in. The tool will automatically suggest some online and 'on the fly' modifications to a client. The suggestion will be based on both efficient pricing optimization algorithms but also client behaviors analysis to better target which modification is more likely to lead to a final trade. The behavior analysis is based either on standard recommendation algorithms or 'in-house' neural networks. Such a tool will greatly improve the user experience of our clients and will lead to a significant improvement of our hit ratio.

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