2017: 30th anniversary of the Master program

More than one thousand graduated students

Laure Elie Alumni
Two courses

1. Statistics and random modelling in finance
2. Statistics and Data Science

Objectives and main features

- High-level training in stochastic and statistical methods oriented towards the applications
- Specialisation in finance, statistics and data science
- In addition to a classical training in quantitative finance, emphasis is put on statistics with dedicated lectures in statistics and finance, risk management
Prospects

- **Professionnal**
  - Quantitative analysts
  - Traders
  - Financial engineers
  - Risk and portfolio managers
  - Activities related to market data
  - Statistical engineers
  - Data scientists

- **Research**
  - PhD
Environment Education/Research

- University PARIS DIDEROT (Paris 7)
  - LPSM: Laboratoire de Probabilités, Statistique et Modélisation, Sorbonne Université et Paris Diderot, CNRS, UMR 8001
    - http://www.lpsm.paris
  - Team Mathématiques financières et actuarielles, probabilités numériques
  - Team Statistique, Données, Algorithmes
  - Team Structure et modèles aléatoires

- University Paris Panthéon-Sorbonne (Paris 1)
  - SAMM: Statistique, Analyse et Modélisation Multidisciplinaire (EA 4543), University Paris 1
    - http://samm.univ-paris1.fr/
Industrial Partners and professional contributors

- Société Générale
- Lyxor Asset Management
- Natixis
- BNP Paribas
- Deloitte
- HSBC
- Capital Fund Management
- EDF
- Air Liquide
- RTE
- etc.
STRUCTURE OF THE ACADEMIC YEAR 2019/2020

- Starting: September 9, 2019
- Three terms with 8 weeks of lectures each
- Internship from April 6 to September 30, 2019.
Curriculum

60 ECTS

45 ECTS on master modules

15 ECTS for internship

18 ECTS (3 courses) of Mandatory modules

27 ECTS in Optional modules
Among the optional modules, 6 ECTS (i.e. 2 courses) can be validated by courses in their school (in agreement with the studies director and program directors of M2MO).

Stage de fin d’études can be validated as internship of the Master.
Course n°1: Statistics and random modelling in finance

- **Core modules in term 1**
  - **Mandatory 1:** 6 ECTS
    - Stochastic calculus and diffusion processes - S. Péché (TD: B. Laslier)
  - **Mandatory 2:** 6 ECTS
    - Random modelling in finance – P. Tankov and S. Scotti
  - **Mandatory 3** (except for ENSAE): one course (6 ECTS) among
    - Markov chains - M. Merle
    - Data modelling: founding principles – A. Fischer (TD: S. Gribkova)
    - Introduction to Machine Learning – S. Gaiffas

- **Optional modules (3 ou 6 ECTS)** organised according to the topics: quantitative finance, risk management, assets management, statistics and finance, numerical methods, computer science.
Course n°1: Statistics and random modelling in finance

- **Quantitative finance:**
  - Financial products – B. Bruder (Lyxor AM)
  - Advanced modelling in interest rate – Z. Grbac
  - Energy markets – R. Aid and O. Féron (EDF)
  - Risk model and validation of pricing models – P. Tankov

- **Risk management:**
  - Risk measure and risk management – H. Pham, A. El Alami (Deloitte)
  - Copulas and financial applications – J.D. Fermanian
  - Credit risk modelling – R. Rouge (HSBC)
Course n°1: Statistics and random modelling in finance

- **Assets management:**
  - Quantitative assets management – B. Bruder (Lyxor AM)
  - Stochastic control in finance – H. Pham
  - Algorithmic trading – O. Guéant
  - Nonlinear methods in finance – M.C. Quenez

- **Numerical and approximation methods**
  - Monte-Carlo methods – N. Frikha
  - PDE in finance and numerical methods – Y. Achdou and O. Bokanowski
  - Advanced probabilistic numerical methods in finance – J.F. Chassagneux
  - Asymptotic methods in finance – H. Pham

- **Computer science**
  - C++ - O. Carton
  - Statistical software – S. Souchet
Course n°1: Statistics and random modelling in finance

- **Statistics and finance:**
  - Time series analysis – J.M. Bardet
  - Statistical learning – S. Clemençon and E. Chautru
  - Statistics of diffusion and point processes, and applications to finance – A. Gloter and E. Löcherbach
  - Filtering techniques and statistical analysis in finance – J. Turc (BNP Paribas) and S. Ungari (Société Générale)
  - Introduction to reinforcement learning – J. Lussange
  - Statistics of industry and data science – M. Abdel Sayed and L. Massoulard (Société Générale)
  - Prediction and sequential investment – J.Y. Audibert (CFM)
  - Machine learning in finance – C. Cuchiero
Course n°2: Statistics and Data Science

**Mandatory modules (6 ECTS x3 = 18 ECTS)**

- **Data modelling: founding principles** – A. Fischer (TD: S. Gribkova)
- **Introduction to Machine Learning** – S. Gaiffas
- **Statistical learning** – S. Clemençon and E. Chautru

**Optional modules (3 ou 6 ECTS)**
Course n°2: Statistics and Data Science

- **Data Science**
  - Optimization for learning – G. Garrigos
  - Markov chains – M. Merle
  - Time series analysis – J.M. Bardet
  - Graphical models in machine learning – F. Rossi
  - Machine learning in finance – C. Cuchiero
  - Statistics of industry and data science – M. Abdel Sayed and L. Massoulard (Société Générale)
  - Methods for large data sets – S. Boucheron
  - Data Science projects: use cases for CRM – K. Tribouley
  - Introduction to reinforcement learning – J. Lussange
  - Prediction and sequential investment – J.Y. Audibert (CFM)

- **External course**
Course n°2: Statistics and Data Science

- **Computer science**
  - C++ - O. Carton
  - Statistical software – S. Souchet
Internships

- Internships must be validated by the pedagogical team
  (check the M2MO website for details)

- Over the years 2017-2019:
  - Main topics: 20% in Data Science, 79% in Finance (1/4 data oriented)
    and sometimes insurance
  - Main location: 75% in Paris, 20% in London
    - and US, Hong-Kong, Luxembourg, China etc.
Internships: repartition by company

- A lot of diversity: **80 different companies** for the last three years

- The main ones (60%) being:

- Some others: Air france KLM, Altran Research, Bank of America Merrill Lynch, BGFI Consulting, Groupe ADNEOM, BlackRock, BRED Banque Populaire, Chappuis Halder & Co, China international capital corporation, Credit Foncier, Deutsche Bank, ESTER, EY, Filament Uk, Futurescore, Grabango, Heuritech, KeyQuant, La Banque Postale, Macquarie Group, Meilleurs Agents, Morgan Stanley, NetDevices etc.
Examples of jobs for recent graduated students from M2MØ

- Quantitative analyst (HSBC, SoGé, Natixis, Barclays, Nomura, Bank of America, ...)
- Risk management (JP Morgan, BNP-PAR, AXA, OSSIAM)
- Strategist (Goldman Sachs)
- Trader (Morgan Stanley, UBS)
- Consultant (Murex, Milliman, Ernst&Young, Deloitte)
- Structurer (Natixis, Exane, ⋯)
- Engineer for demand prediction (EDF, ENGIE)
- Data Scientist (MFG Lab, Adot, Spotify, ⋯)
- PhD and career in universities or industries
Registration and application

- For Paris Diderot:
  Open from **April 15 to June 30, 2019**

  https://etudes-formations.univ-paris-diderot.fr/lapplication-ecandidat

  Answer: end of July at last

- For Paris 1 (closed)
Contact and informations

- Master website: google M2MO or http://masterfinance.math.univ-paris-diderot.fr/
- Email: secretariat-m2mo@math.univ-paris-diderot.fr
QUESTIONS?
Structure of the academic year

1st trimester:
- From 9/09/2019 to 10/31/2019
  - Refresher lectures from 9/9/2019 to 9/13/2019
  - Lectures from 9/16/2019 to 10/31/2019
  - Revision from 11/04/2019 to 11/08/2019
  - Examination from 11/12/2019 to 11/15/2019

2nd trimester:
- From 11/18/2019 to 01/24/2020
  - Lectures from 11/18/2019 to 01/24/2020
  - Revision from 01/27/2020 to 01/31/2020
  - Examination from 02/03/2020 to 02/07/2020
  - Christmas vacations from du 12/21/2019 au 01/05/2020

3rd trimester:
- From 02/10/2020 to 03/27/2020
  - Lectures from 02/10/2020 to 03/27/2020
  - Examination from du 03/30/2020 to 04/03/2020

Internship from 04/06/2020 until 09/30/2020