Introducing LIST

Riccardo Bernini – Head of Financial Engineering
Enrico Melchioni – Head of International Sales

Università degli Studi di Pavia

March 2018
LIST in a Nutshell

**LIST** is a **privately owned company** founded in Pisa in **1985**

LIST is **100%** focused on **Banking and Finance** and delivers solutions for:

**Capital Markets** and **Risk Management**

LIST **designs, develops & distributes** its own **technology**

A **product oriented** company

**Innovative**  **Industrial**  **International**
LIST: Technology for the Financial Industry

- Electronic Platforms
- Data Analysis, A.I.
- Screen Trading
- Networking, Internet, Cloud
- Electronic Platforms
- Phone
- Spreadsheets
- Financial Calculators
- Trading Pit
- Algo Trading
LIST global footprint

- **List UK** · London
  U.K. and Northern Europe

- **List Inc.** · Toronto
  Canada & North America

- **List Iberica** · Madrid
  Spain, Portugal and South America

- **List Polska** · Warsaw
  Poland and Eastern Europe

- **List SpA** · Pisa
  (headquarters), Milan, Turin, Trieste, Siena, Voghera; Italy and EMEA

- **List India** · Mumbai
  India and Middle East

- **List Malaysia** · Kuala Lumpur
  Malaysia, China and Far East

*Distributing partners in Israel, China and Taiwan*
LIST KPI

120+ clients in 18 countries
Financial Engineering

Who we are

- Physic: 50%
- Financial Economist: 20%
- Mathematics: 20%
- Engineers: 10%

Who we need

- Quantitative mathematical background
- Interest in financial mathematics
- C++ programming skill
- High level prototyping languages skill: Matlab, Python, MSExcel, R

What we do

- C++ Financial Libraries (pricing, analytics, risk)
- Data analysis
- Functional analysis
- AI - Deep Learning Research for finance
C++ Financial Libraries

Overview of technical and mathematical functionalities implemented in the List libraries
Technical features

Designed and developed in-house, object oriented C++, with the following characteristics:

- Multiplatform (Windows, Linux, Aix)
- Usage of Standard Template Libraries (STL) & Boost
- Usage of template programming
- Design Pattern
Numerical Methods

**Monte-Carlo simulations**
- are multi-dimensional simulations based on a lognormal dynamics with variance-covariance matrix provided by the user (equity) or calibrated by market data (swaption).
- Pseudo-Random Numbers (GFSR and RANLUX) and Quasi-Random Numbers (Sobol);
- Dimensionality Reduction (spectral decomposition); and Variance Reduction (antithetic sampling);
- Optimal Time Stopping (Andersen method and Longstaff-Schwartz).

**Numerical Trees**
- alternative to Monte-Carlo simulations in order to discretizes the filtration on which underlying is defined.
- Deterministic Discretization (binomial and trinomial trees);
- Random Discretization (path integral between beginning and final states of underlying).

**Optimization & Root finding**
- are used for:
  - Calibrating parameters of stochastic differential equations;
  - Best fitting of financial data;
  - Solving high-order equations like yield to maturity calculation;
  - Implied Volatilities calculation.
- Least Squares, Brent, Newton Raphson, Levenberg Marquardt, Bisection, Secant.

**Interpolation and extrapolation**
- are used for querying discrete term structure objects like interest rate curve, credit curve, volatility matrix;
- Linear, Flat, Log-Linear;
- Cubic Spline (global method), Hyman (local method), Hagan West (local method).
FMR4000 Data flow

File system
- XML

Master Database
- GUI
- Importer
- Repository

User Applications
- Python
- Matlab
- Excel
- Java
- .Net
- VB
- SAS
- C

User DB
- Bloomberg

I/O streaming
Financial Engineers Team:
Areas of activity
Financial Engineers Team: Areas of activity

- Trading
- Real time Pricing and analytycs
- Cash Flow Analysis
- Hedging
- Hedging ratios depending on sensitivities
- Synthetic views based on sensitivities
- Portfolio Management
- Risk Management
- Position Keeping
- CF estimation and discounting
- Bucketing P&L
- MTM COC
- Risk analytics and pricing for VAR
Grazie per l’attenzione

https://www.linkedin.com/company/list-spa
http://www.list-group.com
r.bernini@list-group.com