

National University of Singapore



Singapore's
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University

Degree Programs at the Risk Management Institute

Presenter: Dr Oliver Chen

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Who we are

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Outline for today

- **Me**
 - What is financial engineering?
 - Why choose MFE or DPD at RMI?
 - MFE
 - DPD
- **Shirley Tee (current MFE student)**
- **Darren Ong (MFE graduate)**
- **Q&A**
- **Refreshments**

What exactly is Financial Engineering?

- The **development** and **creative application** of modeling and numerical methods to **solve financial problems** and to **exploit financial opportunities**.
- With **innovative financial instruments**, we need to be able to **price** them, to **hedge** them, and use them in a portfolio so that **risks** are appropriately **managed**.

What does a Financial Engineer do?

- Works in areas that require a high-level of **quantitative skills** and **innovative ideas**.
- These areas include: structured finance, derivatives trading, risk management, portfolio investments, corporate financing and financial information technology.
- Possible institutions: banks, hedge funds, pension funds, **regulatory authorities**, etc.

The pillars of financial engineering

**Finance and
Financial Markets**



**Financial
Engineering**

**Mathematics and
Statistics**

Computing

Toolkit that you will acquire

- **Finance and Financial Markets**
 - Asset classes: FX, Bonds, Equities, Commodities
 - Instruments: Forwards/futures, options, swaps, structured products, exotic derivatives.
- **Mathematics and Statistics**
 - Probability, stochastic calculus, time series analysis, numerical methods, optimization.
- **Computing**
 - Programming: C++/VBA/Matlab

Why financial engineering now?

- Crisis and panic have swept markets globally, and financial engineering **seems** to be the cause of all of it.
- The lesson to take from this crisis is not that financial models should be thrown away, but instead that it is **critically important that models are realistic and meaningful.**
- Many of the structured products that were created will not disappear because there are often **very good reasons why they exist.**

Why financial engineering now? (continued)

- Financial engineering is a “hard”, tangible skill and will be valued as ever in the future.
- While the number of MFE programs and graduates have grown, globally there are still fewer than 2,000 quant finance graduates annually (GARP 2007). Compare this to the tens of thousands of MBA graduates.
- Different regions (Asia, Middle East) and sectors (regulators, insurers, accounting firms, rating agencies) still have a shortage of quantitatively trained manpower.

Why a degree program?

- How does a degree compare to a **certificate** (eg. **CFA, PRM, FRM**)?
- While a certificate can serve its purpose, it is necessarily very broad, covering **many topics** with **little depth**.
- A degree should lead to an **understanding of the basis of concepts**, and not just the memorization of the concepts.
- The most important part is not what you learn here, but **what you are enabled to learn later**.

Why not an MBA?

- An MBA is certainly appropriate for some people.
- For most programs, an MBA will focus on the softer skills.
- The MFE and DPD work to develop **hard, tangible skills** on the **quantitative** and **IT** side.
- These will be increasingly needed not only to “**do things**” but also just to “**understand things**”.

Why NUS?

- **Ranked number 30 among global universities in the *Times Higher Education Supplement* – QS, 2008.**
- **4th in Asia in the same ranking.**
- **Superior resources and facilities for over 30,000 students.**
- **Outstanding faculty across the university.**

About RMI

- Established in August 2006 as a university level institution.
- Director: Prof Duan Jin-Chuan.
- Supported by the Monetary Authority of Singapore (MAS) in order to **develop Singapore as a major risk management centre in Asia.**
- The three facets of RMI will enable this:
 - **academic research**
 - **industrial research**
 - **education and training**
- These three facets **complement** and **enhance** each other.

Scholarships available for MFE and DPD

- **Financial Scholarship Program by MAS:**
 - 70% of tuition paid for Singaporeans and PR.
 - Around 5 awarded each year for MFE.
 - 2 year bond with FI in Singapore.
- **RMI Scholarships:**
 - Available also to international students
 - a full tuition waiver for MFE and a partial tuition waiver for DPD
 - opportunity to conduct research on a part-time basis with the research team at RMI.
- **CapitaLand Scholarships:**
 - For international students
 - tuition, compulsory fees, return airfare and allowances for housing, living expenses, etc.
 - 2-3 year bond with CapitaLand

Outline for MFE

- **Aims of MFE**
- **Competitive advantage of the NUS MFE**
- **Options for study**
 - Part-time for working people
 - Full-time for faster completion
 - Distance learning for overseas study
- **Program structure**
- **Awards for students**
- **Past composition of students**
- **External reviews**
- **Admission requirements**
- **Fees**

Aims of MFE

- The Master of Science in Financial Engineering (MFE) at NUS has been running for **10 years**.
- It has successfully equipped its students with the **knowledge** and **skills** needed to be **leaders** and **innovators** in financial engineering.
- Many students are already in the financial industry and are **looking to take on more quantitative roles**, but we also have students that are **looking to enter finance**.
- The focus of the program is not just on the theoretical side, but instead to shape students into “**doers**” that can solve problems.

Competitive advantage of the NUS MFE

- Since the focus is not just on the theoretical, quantitative side we educate students to see the **bigger picture**.
- A degree is **education based**, not knowledge based.
- Models and products will come and go, and you will be capable of **learning the new concepts** that come along.

Competitive advantage (continued)

- **Wide variety of lecturers with diverse perspectives:**
 - **Across NUS:** in Finance, Maths, Stats and Econs.
 - Professors **from overseas:** Poon Ser-Huang (Manchester Bus. Sch.), Jim Zhu (Western Michigan University).
 - Lecturers **from industry:** Lutfey Siddiqi (Managing Director, Barclays), David Zhang (Head of Valuation Control, Barclays)
 - **Overseas modules:** Princeton and Waterloo

Part-time for working people

- Up until now, the MFE has been running as a part time program.
- Various features are in place to **help people that are working full time**:
 - Classes are only in the **evenings 7-10pm** or on **Saturday 2-5pm**.
 - For those with a lot of work travel, **online lectures are available to be viewed**.
- There is **no disruption to your career** in taking MFE.

Full-time for faster completion

- The full-time option is newly available in 2009. Students will be able to **finish in less time**.
- This also enables overseas students to obtain a student visa to stay in Singapore.
- Possible classes are **the same as part-time students**.
- During the day, full time students may have the **opportunity to work as research assistants at RMI**.

Distance learning for overseas study

- Distance learning is available for those who are not based in Singapore. Lectures are available online in **real-time** or **after they occur**.
- Exams are **taken in your home country** with an appointed supervisor.
- There is **no difference** in the lectures, assignments or exams from on-campus students.
- So the degree is the same as any other MFE degree: it is **not marked as distance-learning**.
- If you start as an on-campus student and then are posted overseas, you can **switch to distance learning**.

Program structure

- There are about **16 weeks** in a regular semester including:
 - **10** weeks of **lectures** (3 hours/week)
 - **2** weeks of **tutorials** (3 hours/week)
 - break weeks in the middle and before exams
- **10 modules** need to be completed to obtain the degree.
 - For **part-time**, this can be done in a **minimum of 18 months** and a **maximum of 4 years**. (Maximum of 3 modules per semester). **Usual period is 2 years**.
 - For **full-time**, a minimum of **1 year** and a **maximum of 2 years**.

Program structure (continued)

- Starting in 2009, we are planning an **optional pre-program bridging module in July**. This will ensure that all students start with the right background.
- There are currently 8 compulsory modules and two elective modules.
- There are some planned changes that are up for approval: having **only 6 of the modules as compulsory**, and a **new intensive project module** with more involved collaboration with faculty members.

Awards for students

- The MFE is **well recognized by industry** in Singapore, which grants various awards to graduates:
 - Reuters Prize
 - DBS Gold Medal
 - ST Engineering Prizes
 - PSA Prize
 - Singapore Technology Project Prize
 - MAS Prize

Past composition of students (2007 & 2008 intake)

- **By profession:**
 - 50.5% **Banking and finance**, 30.5% **Engineering**, 12.5% **IT**, 6.5% others.
- **Average age: 30 years**
- **Average number of years of working experience: 5 years.**
- **Other master's/PhD holders 31%**
- **First degree:**
 - 54.5% **Engineering**, 16% **Economics/Business**, 7% **Computer science**, 5.5% **Accounting**, 3% **Science**, 7% Others

External reviews

- **Professor Darrel Duffie, Stanford University:**

*“I was impressed by the rankings, and by the **broad emphasis** on all major areas of financial economics in your program. Some other such programs are focused narrowly on derivatives pricing and risk measurement. Your coverage of other areas, such as empirical modeling, corporate finance, and banking practice, **will serve well the needs of future financial engineering.**”*

- **David R. Koenig, Executive Director of PRMIA**

*“The Risk Management Institute at the National University of Singapore runs one of the **top programs in the world.**”*

Admission requirements

- 4-year undergraduate degree or an honors degree.
- **GMAT** or **GRE** score
- **TOEFL** or **IELTS** score if English was not the instruction language during your undergraduate studies.
- Work experience is preferred but not required.

Fees

- **Application fee: \$50**
- **Non-refundable acceptance fee: \$1000**
- **Rest of tuition for Singaporean or Singapore permanent residents: \$25,000**
- **Rest of tuition for non-citizens and non-permanent residents: \$25,000**
- **Tuition fees are payable by installments.**

Outline for DPD

- Aims of DPD
- Competitive advantage of the DPD
- Part-time, distance-learning and full-time
- Program structure
- Admission requirements
- Fees

Aims of DPD

- Graduates of the NUS-Columbia Double Professional Degree (DPD) Program in Financial Engineering will earn **2 degrees**:
 - Professional degree in Financial Engineering from **Columbia University** (CU)
 - Professional degree in Financial Engineering from **National University of Singapore** (NUS)
- This is a post-Master program with **intensive coursework beyond the Masters level**.
- This is the **first in the world** for financial engineering.



Aims of DPD (continued)

- The DPD aims to provide Master graduates with additional training for skills in the following core areas:
 - **Quantitative methods** such as stochastic modeling, simulation, optimization and statistical tools
 - Financial markets and instruments
 - **Advanced topics** in financial engineering

Competitive advantage of the DPD

- This degree program was initiated to meet the high demand for training **beyond the Masters level in Financial Engineering.**
- **Advanced quantitative skills** can be looked at more in detail in this program that is not available in most Masters-level modules.
- Many of the modules are actually at the **PhD level.**
- The difference between the DPD and a PhD is the lack of a research component which enables **finishing the DPD in a shorter time frame.**
- Benefit of the experience of Columbia University in offering their **top ranked MFE** program.

Part-time, distance-learning and full-time

- As with the MFE program, the DPD will be available as **a part-time program, distance-learning or full-time.**
- The minimum and maximum period to complete the degree is **2 and 4 years**, respectively.

Program Structure

- There are **6 compulsory modules** in the DPD. 4 have to be taken from Columbia and 2 have to be taken from NUS.
- In addition, there are **6 elective modules**. 4 have to be taken from Columbia and 2 have to be taken from NUS.
- The modules from Columbia are all offered by the **Industrial Engineering and Operations Research** and can be taken in New York (additional fees may apply)
- The modules from NUS are offered by **RMI, Finance, Real Estate, Statistics and Computer Science**.

Admission requirements

- A **good Masters degree** in Financial Engineering or equivalent from NUS / CU or their equivalent.
- Good **GRE** score.
- Good **TOEFL** score if English is not your native tongue or the language of instruction in undergraduate studies

Fees

- **Application fee: \$100**
- **Tuition fees: \$75,000**
- **Tuition fees are payable by installments.**



Applications

- For both the MFE and DPD, applications are available on our website through:
www.rmi.nus.edu.sg/degreeprograms
- Applications need to be mailed to us and must reach RMI by **February 27, 2009**.
- Unofficial GMAT and/or GRE scores can be sent with the application, but the official reports must be sent within one month of the deadline.