

# DeGroote Finance & Investment Council

Intro to Quant Finance 2021-2022

# DeGroot Finance & Investment Council

## Overview of Quantitative Finance

### What is Quant Finance?

- Applying mathematical and statistical methods in finance and investment management
- Quants often specialize in specific areas such as algorithmic trading, investment management, risk management, and derivative pricing
- Initially, quants were on the sell-side exclusively but over time the buy-side has added them to their roster
- On the buy-side expect usage of methods such as statistical arbitrage, algorithmic trading, and electronic trading

### Top Firms



### Careers in Quant Finance

Quantitative Research



Portfolio Management



Sales & Trading



Risk Management



Data Science



Strategy & Modeling



### Educational Requirements

- Most firms look for at least a master's degree or preferably a Ph.D. in a quantitative subject, such as mathematics, economics, finance, or statistics
- Master's degrees in financial engineering or computational finance are also effective entry points for quant careers
- Generally, an MBA is not enough by itself to obtain a quant position, unless the applicant also has a very strong mathematical or computational skill set in addition to some solid experience in the real world

### Trading

---

- Quantitative Traders focus more on implementation of strategies developed by Researchers
- Traders use trading tools and monitor portfolio performance making changes to manage risk levels and optimize execution
- Traders don't require the rigorous academic qualifications that researchers need with internships available to undergrad students in quantitative programs

### Portfolio Management

---

- Asset management firms need quants. A portfolio of assets is a collection of dynamically evolving random processes
- If the portfolio contains derivative securities (e.g., futures contracts) as well as stocks and bonds, there may be complicated relationships among the assets
- Plenty of roles exist within large asset management firms and financial institutions such as insurance companies

### Analyst/Research

---

- Quantitative analysts design and implement complex models that allow financial firms to price and trade securities
- Quants that work directly with traders, providing them with pricing or trading tools, are often referred to as "front-office" quants. In the "back office," quants validate the models, conduct research, and create new trading strategies
- Most firms look for at least a master's degree or preferably a Ph.D. in a quantitative subject

### Risk Management

---

- Risk management is the process of identification, analysis, and acceptance or mitigation of uncertainty in investment decisions
- The science of computing and managing the credit and market risk borne by traders and portfolio managers has grown greatly in complexity and importance
- Many roles exist in Risk Management including Portfolio Management, Hedge Funds, Insurance, and Treasury

# DeGroot Finance & Investment Council

## Career Pathways

---

### Undergraduate Route

---

- There are lots of opportunities from internships right out of undergrad as well as rotational programs
- Certain Global Markets rotational programs will give you the chance to rotate through a more quantitative desk
- Landing roles in Data Science, Machine Learning, and Software Engineering are also a great gateway into the space



### Lateral Route

---

- It is often the case that you may not get a rotational program or full-time role right out of undergraduate and graduate school
- Joining a top firm in a similar role where quant roles exist and then moving into it after 1-3 years is a common path



### Graduate Route

---

- Opportunities are available to enter the industry through masters' programs such as the University of Toronto MMF, University of Waterloo MQF, and Columbia University Financial Engineering
- Programs in statistics, computer science, and mathematics are sufficient as well



### Internships/Alternatives

---

- There are quite a few students who manage to land internships at firms and then secure a full-time offer starting in fall or the following summer
- Getting a solid role in your 3rd or 4th-year role can secure your full-time position if you show value
- Quants also commonly come from software engineering backgrounds; it is much less common that commerce students are entering the industry
- Add a sprinkle of STEM, minor in a quantitative field and self-teach



# DeGroote Finance & Investment Council

## Topics & Skills to Learn

### Academics & Extracurriculars

- Exceptional Academic performance in quantitative discipline: Engineering, Math, Computer Science or Physics
- Prove interest in finance through extra-curriculars and/or a minor
- Take high level math courses
- Participate in Competitions and Hackathons



### Technical Skills/Experience

- Machine Learning and Data Science
- Computer Competency – Statistical Analysis
  - C++, MATLAB, SAS, S-Plus
- Computer Competency – Trading Tools
  - Java, .Net, VBA
- Mental Math & Brain Teasers
  - mathtrainer.org



### Financial Markets & Derivatives

- Options
  - Call vs. Put, Strike Price, and European vs. U.S.
  - Holder has the right to buy/sell the underlying asset by a certain date for a certain price
- Futures
  - Agreement to buy or sell an asset at a certain future time for a certain price but on a normally traded exchange
- Forwards
  - Identical to Futures but traded OTC Market

### Interview Preparation

- Interviews are often a blend of technical finance, computer science, and statistics questions
- Heavier emphasis on computer science, statistics, and problem-solving ability
- Be prepared for questions from Leetcode (algorithmic, common concepts tuples, lists, hashmaps etc...)
- Sample Questions
  - What is the sum of the numbers one to 100?
  - Given 100-coin flips, what is the probability that you get an even number of heads?

# DeGroote Finance & Investment Council

## Firms

---

### Canadian Banks



### U.S. Bulge Brackets



### European Bulge Brackets



### Private Equity



### Hedge Funds



### Other



### Investment Firms



### Pension Funds



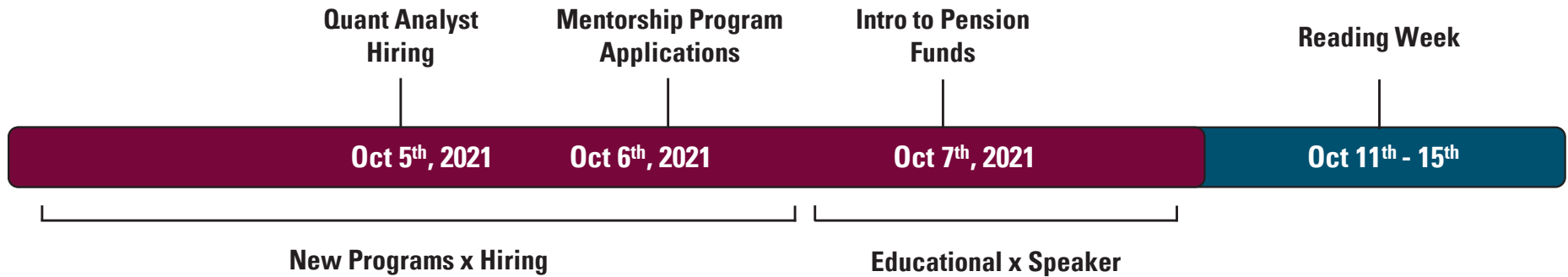
### Family Offices



# DeGroot Finance & Investment Council

## Upcoming Events

### Timelines



### Event Descriptions

#### Quant Analyst Hiring



DFIC is forming a **Quant Group**, apply to join our newest team

#### Intro to Pension Funds



Learn about Pension Funds from **Jeffery Howson** and a special guest from CPP

# DeGroot Finance & Investment Council

Apply to Join DFIC Quant Group Now!

---





# DeGroot Finance & Investment Council

Connect With Us

---



**Owen Marshall, President**  
DeGroot Finance & Investment Council  
*marshao@mcmaster.ca*  
(613) 325-4705



**Ryan Whitcher, VP Investment Council**  
DeGroot Finance & Investment Council  
*whitcher@mcmaster.ca*  
(647) 982-6650

**Wynette Wong, VP Events**  
DeGroot Finance & Investment Council  
*wongw26@mcmaster.ca*  
(647) 537-8869

**Siemens Ogbeide, VP Private Markets**  
DeGroot Finance & Investment Council  
*nosaogbs@mcmaster.ca*  
(647) 470-7056

**Zarik Virani, VP Investment Council**  
DeGroot Finance & Investment Council  
*viranz2@mcmaster.ca*  
(416) 716-3422

**Kayden Hudda, VP Events**  
DeGroot Finance & Investment Council  
*huddak1@mcmaster.ca*  
(905) 320-6049

**Jeff Howson, VP Private Markets**  
DeGroot Finance & Investment Council  
*howsoj1@mcmaster.ca*  
(905) 703-5383





**Cynthia Huang**  
Vice President at RBC Capital Markets



2016 - Present



2016



2014



2012 - 2017