Master of Engineering

Program Information

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ORIE Graduate Programs
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https://www.orie.cornell.edu/orie/programs/graduate-programs/meng-degree-ithaca
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## Two ORIE MEng Options

<table>
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<tr>
<th>Faculty</th>
<th>35 (and growing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Length</td>
<td>2 or 3 semesters</td>
</tr>
<tr>
<td>Program Size</td>
<td>~100</td>
</tr>
<tr>
<td>Specializations</td>
<td>7</td>
</tr>
<tr>
<td>Coursework</td>
<td>30 cr: Core + Project + Electives</td>
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<tr>
<td>Industry Touchpoints</td>
<td>MEng Projects and Colloquium</td>
</tr>
<tr>
<td>Soft Skill Development</td>
<td>MEng Connect/Career Practicum</td>
</tr>
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Focus of this presentation: See [https://tech.cornell.edu/programs/masters-programs/master-in-operations-research-and-information-engineering/](https://tech.cornell.edu/programs/masters-programs/master-in-operations-research-and-information-engineering/)
Program Objectives

- Master and Apply Core Disciplinary Knowledge
- Engage in Collaborative Problem Solving
- Tackle Complex Problems and Develop Solution Approaches
- Communicate Findings and Recommendations Effectively
- Cultivate Self-Directed Learning and Professional Development
What Do We Prepare You For?

• Financial Services/Banking/Risk Management (~50%):
  American Express, Bank of America, Barclays, BNP Paribas, BlackRock, Citi, FINRA, Goldman Sachs, JP Morgan, M&T Bank, Moody’s, Morgan Stanley, Nomura, Prudential, RBC, State Street, Susquehanna International Group, UBS, ...

• Consulting (15-25%):
  Accenture, Bain & Company, BCG, Booz Allen Hamilton, Deloitte, End to End Analytics, EY, IBM, KPMG, McKinsey, Mitre Corporation, PwC, Stroud Consulting, Kurt Salmon Associates, ZS Associates, ...

• Data Science/Technology (15-25%):
  Amazon, Axtria, Bloomberg, Capital One, Carmax, Facebook, Infor, Google, Jet.com, Microsoft, Supplyhouse.com, Twitter, Walmart.com, Wayfair, Workday...

• Operations/Logistics/Manufacturing (5-10%):
  Delphi, DuPont, E&J Gallo, Lockheed Martin, Sandisk, Schlumberger, UPS, ..
ORIE MEng Placement

- May 2017 Graduates
  - 1 month before graduation: 72%
  - After six months: 100%
- December 2017 Graduates
  - 1 month before graduation: 69%
  - After six months: >95%
- May 2018 Graduates
  - 1 month before graduation: 67%
  - After six months: TBA

Median Starting Salary was $90,000 in 2017
Source: ORIE Exit Surveys

Median Starting Salary was $85,000 – $90,000 in May 2018
Source: ORIE Exit Surveys
Alumni Prepared to Lead

33 C-Level/Board Roles
32 Founders/Owners
70+ Presidents/Vice Presidents
100+ Managing/Executive Directors

and the list goes on...

Creating Impact in Peoples’ Lives

Manufacturing Pharmaceutical
Public Policy R&D
Data Science Technology
Healthcare Insurance

Finance Supply Chain Automotive
Consulting Transportation Energy
Education Hospitality
Recognized Success

Finalist in 2018 and 2012

... and many more!
MEng Program Highlights

• Prerequisites
• Program Framework
• Concentrations
• MEng Projects
• Professional Development

Check out: http://orie.cornell.college-tour.com/
Prerequisites

Prior to starting, you must have successfully completed:

• A complete **engineering calculus sequence**, including linear algebra and vector calculus, similar to the Cornell sequence: MATH 1910, MATH 1920, MATH 2940

• An **engineering probability and statistics course** similar to Cornell’s ENGRD 2700

• An **intermediate-level computer programming course** using a general programming language such as Python, C++, Java, or MATLAB, similar to Cornell’s ENGRD 2110

Note: Data Analytics and Financial Engineering concentrations have *additional* prerequisites.
Program Framework

• **30+ credit hrs** of coursework*, consisting of:
  - ORIE Core
  - Concentration-Specific Electives
  - Concentration-Specific Project
  - Project Prep (for non-FE students only: ORIE 5100 or ORIE 5110)
  - Career Practicum (ORIE 9115 for non-FE; ORIE 5215 for FE)
  - Colloquium (ORIE 9100 for non-FE; ORIE 5210 for FE)

• Good Academic Standing*

• Exit Surveys*

*See Handbook for details:

https://www.orie.cornell.edu/orie/programs/graduate-programs/meng-degree-ithaca/meng-resources
ORIE Core Coursework

- Every ORIE MEng student must take **12+ credit hours** of approved coursework among the following areas:
  - Optimization Modeling
  - Stochastic Modeling
  - Data Science and Statistical Modeling

- These 12 credit hours must include:
  - **3+ credit hours** in each* of the three areas
  - **8+ ORIE credit hours** with 3+ at 5000-level

- Approved courses for each area are listed in the Handbook (pp.6-7)

*Students who have previously completed 6 or more credits of ORIE Core course work in an area may be eligible to waive that area. At most one ORIE Core area can be waived. See Handbook for details.*
Concentrations

- Applied Operations Research
- Data Analytics
- Information Technology

~30-40%

- Financial Engineering (3rd Semester at CFEM)

~50-60%

- Manufacturing and IE*

~5-10%

- Strategic Operations*
- Systems Engineering Minor*

*Administered in conjunction with other programs. See Handbook for details.
Applied Operations Research

• Most flexible concentration option

• AOR concentrators must complete 12+ letter-graded credit hours of ORIE-labeled coursework, comprised of:
  ➢ Any ORIE courses taken to satisfy Core requirements
  ➢ Additional ORIE courses at or above the 4000-level, excluding project, practicum, colloquium, and independent study courses

• MEng Project: ORIE 5980/ORIE 5981
  ➢ Wide variety of project topics
  ➢ ORIE faculty serve as project advisors
  ➢ Project slate presented in mid-October
  ➢ Project cycle runs November – May
Data Analytics

- **Additional Prerequisite:**
  - *TWO-semester* prob/stat sequence such as ENGRD 2700/ORIE 3500

- DA concentrators must complete 3 or more elective courses for 9+ letter-graded credit hours, comprised of:
  - 1 or more additional courses from the Core list of Data Science and Statistical Modeling area
  - 1 or more courses from the approved DA Elective list (Handbook, p. 12), with at most 3 cr hrs in NBA, AEM, HADM courses

- MEng Project: **ORIE 5980/ORIE 5981**
Financial Engineering

• **Additional Prerequisites:**
  - *TWO-semesters* of prob/stat/stochastic processes such as ENGRD 2700 plus (ORIE 3500 or ORIE 3510)
  - Introductory finance course (*not* economics or accounting)
  - **Strongly advised:** Differential Equations, such as MATH 2930, and proficiency with C++ and/or Python.

• 3-semester program designed to prepare students for careers in quantitative finance
  - Balance of theory and practice across a broad range of financial functions and applications
  - 3rd semester at CFEM (in NYC) features practitioner-led education
  - Offers option to pursue *Financial Data Science* Certificate (see Handbook, p. 14)
Financial Engineering

• FE concentrators must complete 12+ letter-graded credit hours of Financial Applications Electives:
  - See Handbook, pp. 13-14, for options
  - 6 or more of these credits must be earned during the third term at CFEM in courses numbered ORIE 52XX

• MEng Project: ORIE 5220
  - ORIE faculty serve as project advisors
  - Project slate presented and teams assigned in April-May
  - Students engage in basic fact finding during the summer
  - Project cycle runs August – December (of the second year)
**Information Technology**

- IT concentrators must complete **four approved elective courses** for 12+ letter-graded credit hours, comprised of courses in the following areas (see Handbook, pp. 15-16):
  - Technology and Infrastructure (≥ 1 course)
  - Information Economics and Strategy (≥ 1 course)
  - Managing IT Implementation (≥ 1 course)
  - Approved IT Elective list (≤ 1 course, optional)

- Up to one IT elective course taken for **ORIE Core** credit may count towards **both** IT concentration requirements and **ORIE Core** requirements

- MEng Project: **ORIE 5980/ORIE 5981**
Strategic Operations

• “SSO” concentrators complete the Johnson School’s Strategic Operations Immersion (also called the Semester in Strategic Operations, or SSO) during the spring term.

• No separate “MEng Project” course. SSO entails industry-sponsored team-based projects with deliverables.

• Aside from SSO, concentrators may count at most 3 cr hrs in NBA/AEM/HADM courses toward MEng requirements.

• SSO concentrators must complete all other MEng requirements (including ORIE Core, colloquium, and the career practicum) during the fall term.*

* If ORIE 5126 (4 cr) is taken as part of SSO, it may be counted towards ORIE Core requirements.
Manufacturing & IE

- M&IE concentrators must complete 9+ credit hours of approved M&IE elective courses (see Handbook, p. 17) and the following Manufacturing Focus courses:
  - ORIE 5100: Design of Manufacturing Systems (F 4 cr)
  - NBA 5530: Accounting and Financial Decision Making (S 3 cr)
    or NBA 5020: Managerial Accounting and Reporting (S 3 cr)
  - ORIE 9100: Enterprise Engineering Colloquium (F or S 1 cr)

- ORIE 5100 and other M&IE electives taken for ORIE Core credit may count towards both M&IE concentration requirements and ORIE Core requirements. ORIE 9100 satisfies the M&IE and the ORIE colloquium requirements.

- MEng Project: ORIE 5910/ORIE 5911
Systems Engineering Minor

• Systems Engineering concentrators must complete the requirements for the Systems Engineering Minor*:
  ➢ ORIE 5140 Model-Based Systems Engineering (F 4 cr)
  ➢ ORIE 5142 Systems Arch., Behavior, Optimization (S 3 cr)
  ➢ CEE 5900 Project Management (F or S, 4 cr)
  ➢ Approved elective with Systems content

• MEng Project: ORIE 5940 (F and S, 3 cr each)

*The minor designation is open to multiple fields across the College of Engineering – not just ORIE
MEng Projects

• Wide variety of client organizations, industries, project topics, and needed ORIE skill sets

• Faculty members serve as advisors

• Project timeline and format vary by concentration, all are at least 5 credit hours

• Deliverables include professional quality project report and presentation to client

http://orie.cornell.college-tour.com/
https://www.orie.cornell.edu/news/top-master-engineering-project-teams-and-students-are-recognized-graduation-ceremony
### 2018-2019 ORIE 5980 Projects

<table>
<thead>
<tr>
<th>Project Partner</th>
<th>Project Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Home Depot</td>
<td>Online Merchandising Content / Promotion Optimization</td>
</tr>
<tr>
<td>Atlanta, GA</td>
<td></td>
</tr>
<tr>
<td>Hospicare</td>
<td>Women Swimmin’ for Hospicare</td>
</tr>
<tr>
<td>Ithaca, NY</td>
<td></td>
</tr>
<tr>
<td>Hospital for Special Surgery</td>
<td>Right-Sizing Capacity Across the HSS System</td>
</tr>
<tr>
<td>New York, NY</td>
<td></td>
</tr>
<tr>
<td>Equifax</td>
<td>Predicting Credit Risk With Financial Time Series</td>
</tr>
<tr>
<td>Atlanta, GA</td>
<td></td>
</tr>
<tr>
<td>Pitney Bowes</td>
<td>Tackling Exploding eCommerce in the Northeast using Machine Learning and Optimization</td>
</tr>
<tr>
<td>Stamford, CT</td>
<td></td>
</tr>
<tr>
<td>Pitney Bowes</td>
<td>Universal Product Categorization</td>
</tr>
<tr>
<td>Stamford, CT</td>
<td></td>
</tr>
<tr>
<td>FMCG Direct</td>
<td>Using AI and Machine Learning to Improve Marketing Campaign Performance</td>
</tr>
<tr>
<td>New York, NY</td>
<td></td>
</tr>
<tr>
<td>Walmart eCommerce</td>
<td>Inbound Supply Chain Analysis and Optimization</td>
</tr>
<tr>
<td>San Francisco, CA</td>
<td></td>
</tr>
<tr>
<td>Booz Allen Hamilton</td>
<td>UnMASQing Cyber Threats</td>
</tr>
<tr>
<td>Washington, DC</td>
<td></td>
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# Fall 2018 ORIE 5220 (FE) Projects

<table>
<thead>
<tr>
<th>Project Partner</th>
<th>Project Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliance Bernstein</td>
<td>Text Mining in Chinese</td>
</tr>
<tr>
<td>CBXmarket</td>
<td>AI Price Validation</td>
</tr>
<tr>
<td>CITI</td>
<td>Treasury Risk Management</td>
</tr>
<tr>
<td>Clinton Group</td>
<td>Alpha Discovery for Equity Market</td>
</tr>
<tr>
<td>Guardian Life Insurance</td>
<td>Is Momentum a Factor in Corporate Bond Excess Returns?</td>
</tr>
<tr>
<td>Kensho</td>
<td>Event Studies on the Kensho Platform</td>
</tr>
<tr>
<td>Parable Insight</td>
<td>Prospecting for Future Acquisition Targets</td>
</tr>
<tr>
<td>Quantopian</td>
<td>Automatic Content Recommendation System</td>
</tr>
<tr>
<td>Rebellion Research</td>
<td>Incorporating Fundamental or Alternative Data to Create an Economic Learner</td>
</tr>
<tr>
<td>TD Bank</td>
<td>Smart Beta Investments</td>
</tr>
<tr>
<td>UBS</td>
<td>Optimal Risk Management</td>
</tr>
</tbody>
</table>
Professional Development

In addition to the full array of workshops, seminars, career fairs, on-campus recruiting, online resume submission, etc, offered through Cornell Career Services and the Cornell Engineering Career Services, ORIE MEng students have:

- Summer Prep Webinars
- MEng Connect/FE Bootcamps
- Business Cards/Online Profiles
- Career Practicum
- Colloquium/Seminars
- CFEM Career Support for FE
Applying to ORIE MEng Program

Application Deadline for Fall 2019 is December 1st

• Apply online through the Cornell University Graduate School: http://www.gradschool.cornell.edu/admissions/apply

• A completed application includes:
  ➢ Statement of purpose
  ➢ Transcript(s)
  ➢ Resume
  ➢ 2 letters of recommendation (3 preferred)
  ➢ Official GRE scores (Cornell UGs exempt)
  ➢ Official TOEFL/IELTS scores (if applicable)
  ➢ Prerequisite completion plan
  ➢ Early Admit Study Plan* (if applicable)
  ➢ Application fee
  ➢ Video Interview (if requested)

*Cornell UGs who will have 8 or fewer credit hours remaining towards the BS might be eligible to start the MEng during their final UG semester. See MEng Handbook.
Financial Aid

- Financial aid for the MEng is limited. All aid is merit-based, not need-based.
- You are automatically considered for partial tuition fellowships and Graduate Teaching Specialist (GTS) positions by the School of ORIE when you apply to the MEng program. Spring GTS positions are typically awarded late in the fall semester.
- MEng students are not eligible for research assistant positions.
- All MEng applicants can apply for the Knight Fellowship as part of the MEng application process. These awards are intended for students who (eventually) want to pursue an MBA in addition to the MEng:
  
  https://www.engineering.cornell.edu/admissions/graduate-admissions/admissions-meng-students/knight-scholarship-program

- Loan Information:
  
  https://gradschool.cornell.edu/policies/loans/
  http://www.globalslc.com/ (information only -- this is not an endorsement)
Special Awards for Cornell UGs

• **The Geraldine and Sam Dell Master of Engineering Fellowship**
  Awarded annually to an exceptional Cornell UG pursuing the ORIE MEng. The recipient must demonstrate strong ethical grounding, leadership, teamwork, and have a fundamental understanding of the application of theory to practical business problems.

• **The Sterry Master of Engineering Fellowship**
  Awarded annually to two exceptional female Cornell UGs pursuing the ORIE MEng.

• **The Lynn Bussey Prize** and **The Allan H. Mogensen Award**
  Awarded annually at commencement to outstanding students in ORE pursuing the ORIE MEng.
Important Dates to Remember

- **Sunday, December 1, 2018**: Fall 2019 Application Deadline
- **Monday, April 15, 2019**: Decision Deadline for Fall 2019
- **Wednesday, August 21 – Friday, August 23, 2019**: MEng Connect Program
- **Thursday, August 29, 2019**: Classes start for all Cornell students
Questions?

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