Department of Chemical Engineering
Graduate Studies Information Session

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Agenda

- Part I: Graduate Studies at Queen’s University
- Part II: External Scholarships (deadlines & procedures)
- Part III: Active research topics and position openings (various Faculty members)

Objectives

- Find out about Graduate Studies in Chemical Engineering
- Learn about opportunities and deadlines for Scholarships
- Listen about current and exciting research openings
Department of Chemical Engineering

- Web: http://my.chemeng.queensu.ca/index.html
- Research-intensive department
- 23 Faculty members
- Over 90 graduate students (45 PhDs)
- Vibrant graduate student community (CEGSA)

Research Areas

- Bioengineering
- Process Systems Engineering and Systems Biology
- Materials & Interfaces
- Clean Energy and Sustainable Environment
- Graphene Integrated Functional Technologies (GIFT)

Research collaborations

- Joint R&D projects with industry
- Interdisciplinary research
- National and international collaboration networks
Why pursue Graduate Studies?

• Intellectual challenge

• Advance your knowledge in a specific field
  • Individual research + courses
  • Discussions with others

• Broaden your career opportunities
  • For positions requiring greater technical depth (e.g. Technical consulting or research)
  • In other fields (e.g. Biomedical engineering)
  • Academic positions
Course-based Master’s Degree – M.Eng.
- Eight graduate courses, no thesis
- No financial support
- Time-to-completion: 8-12 months

Research Master’s Degree – M.A.Sc.
- Four academic courses
- Substantial research component
- Preparation of a written Master’s thesis
- Guaranteed minimum of $25,000/yr for up to 24 months
- Time-to-completion (average): 24 months
M.A.Sc. (4 courses + 1 seminar + 1 thesis)

- May 1\textsuperscript{st}, Sept. 1\textsuperscript{st}, or Jan. 1\textsuperscript{st} admissions
- Expected completion in <2 years
- Thesis should “demonstrate candidate is capable of original and independent work”; mainly directed by supervisor
- Typically leads to a research publication
- Thesis preparation and defense
• **Doctoral Degree – PhD**

  • Either following a complete MASc (or promotion from MASc)
  • Three additional courses, substantial but largely self-directed research component, two seminars and a thesis
  • Original contributions
  • Guaranteed minimum of $25,000/yr for up to 48 months
What does it take to get in?

• General minimum requirements
  • B+ average (77%) in the last year of study (or equivalent)
  • Two good academic references

• Competitive – higher the average, better your chances

• Application helped by demonstrated initiative, independent study, awards
Do I need to find my own supervisor?

• Contact professors in your area of interest
  • Don’t be afraid to approach profs to talk about their research
  • Approach them after class

• Web
  • Go to university websites, research their programs and contact them: http://my.chemeng.queensu.ca/

• Literature
  • Recommended readings in class
  • Look in technical journals, prof’s publications lists
How do I apply?

- Online application
  - List academic background, work experience, awards
- Letters of reference & transcripts
  - Two “academic” references
  - No transcript for Queen’s students; sealed transcript elsewhere
- Application deadlines vary by university and/or program
  - First-come, first-served
  - Apply by March 1st if you are interested in additional funding
- International applicants
  - English test is required if home country’s language of instruction is not English; exemption if currently studying in English
Financial Support

• Research Master’s & Ph.D. receive a stipend
  • Composed of awards and contracts (QGA, RA, TA)

• Minimum support package is $25,000 for 2021

• Funding is higher for:
  – External Scholarship Winners
    • NSERC (Federal), OGS (Provincial), other
  – Internal Scholarship Assignments
    • Fellowships, OGSST, McLaughlin ($10K-$15K/yr range)
Combined BASc/MASc Program in Chemical Engineering
(a.k.a. “Accelerated Master’s”)

Brief history
• Program approved in May 2018
• First students admitted in Fall 2018
• Current Program participants: 5
  ➢ Current 4th yr students: 3

Benefits to the student
• Dual degree Program (Bachelor’s + Master’s)
• Time-to-completion for the Master’s degree can be reduced by up to 2 terms
• Undergrad research work can be become MSc thesis work
• Undergraduates obtain a taste of what graduate studies are like
• Competitive advantage when applying for graduate Fellowships
Combined BASc/MASc Program requirements

- GPA: **A- or better** at the time of application to the Accelerated master’s program
- GPA: B+ or better at the time of application to the School of graduate Studies
  ➢ These requirements have been set by SGS and cannot be waived
- Enroll for a 4th year Research Project (CHEM 417, CHEE 408, CHEE 401, etc.)
- Enroll for graduate course(s) in 4th year (take them as tech electives ➔ Ask Liann)
- Apply to SGS for admission to the Master’s Program (Fall/Winter of 4th year)
Additional “Flavours” (Programs of Study)

• Collaborative Biomedical Engineering (CBME)  
  http://my.engineering.queensu.ca/programs/bme/

• Collaborative Masters in Applied Sustainability (CMAS)  
  http://www.queensu.ca/sgs/applied-sustainability-collaborative)
Plan Ahead...

• Review your course selections in 4th year
  • Technical electives provide an opportunity to gauge your interest in research fields, gain additional background for your application, do a 4th year research project

• Summer employment
  • Opportunity to work in a research environment or gain industry perspective

• Interest groups show leadership
  • Chem-E-Car, Concrete Canoe, CHEE/ENCH Executive
Part II

External Scholarships
(Deadlines & Procedures)
External Scholarships

• NSERC & OGS
  • Good academics (A- or better)
  • Strong references
  • Research experience, awards, extracurricular activities

• Stronger application with scholarships
  • Holding an NSERC or OGS makes you very a competitive candidate

• NSERC application deadline: December 1st!

• OGS is part of your MASc application
  • To be eligible, you receive admission by March 1st, 2022
• **NSERC Post-Graduate Scholarship**
  - Maximum of 4 years of support in any graduate program with not more than 1 year held at the Master’s level
  - If you receive an NSERC in year 1 of a Master’s, you should apply for OGS in year 2 or seek promotion to the Doctoral program

• **$17,500 per year for Master’s**
  - Topped-up at Queen’s to $31,000 in total funding

• **$35,000 per year for Doctoral**
  - Topped-up at Queen’s to $50,000 in total funding
OGS – Ontario Graduate Scholarship

- Awarded by departments in each university
- Your graduate application will have a YES/NO checkbox for OGS
- Saying yes will take you to the OGS portion of the application
- Other universities may have different procedures so follow their instructions (you need to provide your OGS application information for each grad school application you fill out in Ontario)
OGS Scholarship

- Maximum of 4-5 one-year awards
- Must apply each year
- Canadian citizen or permanent resident (one international student is nominated each year)
- >A- over last 20 term-length courses

- $15,000 per year
  - Topped-up at Queen’s to $31,000 in total funding
Get Started Now!

• Apply as soon as you can; applications are open NOW
• Send email to phillipl@queensu.ca to receive more information and links
• Think about your general research topic
• Contact professors
  • Talk to current grad students including your TA
  • Use the tools you have, web searches
QUESTIONS?
Part III

Active Research Topics and Position Openings*

* For additional active research areas and potential new openings in the department, please contact individual Faculty members
Combining Data and Fundamental Models
- Designing experiments to estimate model parameters
- Combining information from fundamental and empirical models for process control
- Estimating prediction uncertainty
- Accounting for mismatch and uncertainty during model-based monitoring, control and optimization

\[
\frac{dx}{dt} = f(x, u, \theta) + \eta
\]

Gas-phase polyethylene
- Acrylate coatings
- Nylon production
  - Using additives to achieve target molecular weight

Other Process Modeling
- Conversion of bio-based waste to chemicals and fuels
- Models for scale-up of pharmaceutical production
Evaluating Risks to Human Health and Cleaning Up the Natural and Built Environment

Currently Recruiting MASc and PhD Candidates:

- Fate, transport, and effects of micro- and nanoparticles in freshwater systems
- Graphene-based filtration of per- and polyfluorinated alkyl substances from ground- and surface water

Louise Meunier, P.Eng., PhD
Assistant Professor,
Department of Chemical Engineering
to Existing Contaminants

- Develop *in-vitro* methods to **assess risks** to humans and the environment;
- Implement **remediation** where required;
- **Mitigate** clean-up requirements & costs.

to Contaminants of **Emerging Concern (CEC)**

- **Identify** toxic effects and pro-active intervention **before exposure**;
- Develop sensing methods to **detect** the presence of contaminants;
- Inform design & production to **reduce risks of exposure** to novel materials.
A. Docoslis Research Group
(Bio)chemical sensing

Medical diagnostics

Environmental Monitoring

Food Safety

Detection of Hazardous Substances

Criteria for efficacy:
1. Sensitivity
2. Specificity
3. Rapid
4. Cost-effective
5. Portable
For more info go to the Departmental web site:

http://my.chemeng.queensu.ca/index.html

Thank you for your attention!

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