New Student Orientation 2016

Prof. Ken Shull
Director of Graduate Studies
PhD Program Overview

What needs to happen here to ensure your success after you graduate?
PhD Program Overview

• **Coursework + Colloquia:** foundation, to which you will add new knowledge.

• **Research:** skills you need to identify important challenges, define scientific problems, seek solutions.

• **Everything else:**
  - Teaching
  - Professional conduct (ethics, safety)
  - Communication with scientists and others
  - Working in teams, contributing to non-scientific goals
  - Networking, self-promotion
Coursework (Y1, Y2)

- Typically 3 per quarter
- **Core courses**: 5 required, all in Year 1
- **Elective courses**:
  - 4 400-level courses, at least 3 of which are MatSci 4XX.
  - 2 related courses for “minor” + 4 other grad courses
  - Have an M.S.? Credit for up to 6 courses.
  - Advising info on Monday and Tuesday

- **Preliminary Exam** (Due June 3 of Y1, March for MS)
  - Core GPA > 3.2
  - Research performance assessed by adviser and faculty
Course & Research Evaluations

• Preliminary Exam (June of Y1, March for MS)
  - Core GPA > 3.2
  - Research performance

• Qualifying Exam (Fall Y3, Y2 for MS)
  - Thesis proposal defense (admission to candidacy)
  - Evaluation of core knowledge and its application
  - Evaluation of research promise based on first two years of research
Research Evaluations

• **Annual check-in following qualifier**
  - Is student making reasonable progress towards the PhD degree?

• **Thesis Defense**
  - Significant advance in an area of MSE: how has the field been changed? What new opportunities have been defined?
  - Typically a few first author publications.
PhD Program Overview

• **Coursework + Colloquia**: foundation, to which you will add new knowledge.

• **Research**: skills you need to define and solve scientific problems.

• **Everything else:**
  - Teaching
  - Professional conduct (ethics, safety)
  - Communication with scientists and others
  - Working in teams, contributing to non-scientific goals
  - Networking, self-promotion
TA Requirement

• Essential part of doctoral training
• 2-3 courses (depends on time commitment)
• Commitment level varies, as does the nature of the work.
• Additional pay and opportunities for those who desire more teaching experience
• There are resources for TA training
Fall, 2016 TA Opportunity

Northwestern University: MSE Core Curriculum

<table>
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<th>Course</th>
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<th>Labs</th>
<th>Computation</th>
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http://msecore.northwestern.edu/
Eq. 3.11 is plotted in Figure 3.2 for three different time points.

![Image](http://msecore.northwestern.edu/)

**Figure 3.2:** Representations of Eq. 3.8 for different values of the diffusion length, $\ell_A^D$.  

In many cases all we need to know is the diffusion length, $\ell_A^D$, in order to understand what is going on at a pretty high level of detail. For example, $\ell_A^D$ describes both the width of interfacial mixing for two materials that are brought into contact with one another (Figure 3.1) and the diffusive broadening of a thin interfacial layer (Figure 3.2). The quantitative interpretation of the diffusion length in these two circumstances is illustrated in Figure 3.3. In Figure 3.3a we plot the interfacial broadening for a thin layer that is diffusing in the positive and negative $z$ directions. The width of the diffusion profile can be characterized by the half-width of the peak, $w'$, evaluated at half the total peak height. In Figure 3.3b we plot the concentration
Responsible Conduct in Research: Training and Resources

• Safety first (Tues, in research groups)
• Ethical conduct in research and coursework
  – CITI Training: DUE BY OCT 19
  – Gen Eng 519
• **Register for Gen Eng 519 within first year.**
Managing Conflict

• Conflicts of interest are impossible to avoid completely.
• Not all conflicts are "bad".
• Learning to manage conflict is part of your professional development.

What should you do if you are not comfortable with an incident or situation?
Student Support & Conflict Management

• Do not wait to raise concerns.
• Make use of University counseling resources.
• Bridget Sweeney Marino and Kathleen Stair serve as non-faculty points of contact (confidential).
  – Is my concern concerning?
  – What is the best path to resolution?
• The Chair (Luijten) and Director of Graduate Studies (Shull) can be contacted at any time.

http://www.tgs.northwestern.edu/graduate-life/dealing-with-conflict/index.html
Mental Health and Well-Being

You should let your friends and advisor know when...

- You have not "felt like yourself" for some time.
- You are having difficulty focusing on work or making progress.
- Your feelings about coursework and/or research are mostly negative.
Adviser Selection Process

• **Orientation Week:**
  – Faculty research presentations
  – Poster session (Thursday)

• **September 19- October 17 (4 weeks)**
  – Read papers, meet with faculty individually
  – Talk with graduate students
  – Submit straw poll October 12

• **October 19: turn in selection form (with CITI completion certificate)**
Selection Process: Round 2

• **October 21- November 7:**
  - 2nd placement round research

• **November 7:** turn in updated advisor preferences
To Do

• CITI on-line course
• Register for Gen Eng 519
• Office of Fellowships/TGS Info
  - NSF GRFP deadline for US Citizens
Questions?

• Coursework
• Research
• Practical
Adviser Selection Form

DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING
Adviser Selection Form for Incoming Graduate Students

This form is due in the Department Office by 4:00 pm, Monday, October 19, 2015, with your CITI completion certificate.

STUDENT NAME:

ADVISER/RESEARCH PROJECT CHOICES:

Your top choice should be number one and then proceed in descending order. You are responsible for confirming with the prospective adviser that the necessary financial support is available for each project selected. You may list a second choice project for a given faculty member. Students are required to meet with a faculty member prior to listing that faculty member as a preferred adviser.

1. FACULTY NAME:
   PREFERRED PROJECT(S):

2. FACULTY NAME:
   PREFERRED PROJECT(S):

3. FACULTY NAME:
   PREFERRED PROJECT(S):

4. FACULTY NAME:
   PREFERRED PROJECT(S):

(Do Not Sign until after an adviser/project has been agreed upon)

STUDENT SIGNATURE:

FACULTY SIGNATURE:

ACKNOWLEDGEMENT OF STUDENT-FACULTY MEETING

Students are required to meet with a faculty member prior to listing that faculty member as a preferred adviser on the opposite side of this form. If a face-to-face meeting was not possible, a phone conversation (not email exchange) is an acceptable substitute. In this case, please write “Phone Conversation” and the date in lieu of the faculty signature. The Department is keen on and indeed encourages students to meet with a range of prospective advisers and obtain their signatures below—this is an important step in the process of joining the department.

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<th>Signature</th>
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