ECSE Doctoral Program
Meeting

Prof. Kenneth S. Vastola
ECSE Graduate Program Director (GPD)

September 2, 2015
Who Should Be Here?

- Anyone who is considering a PhD in ECSE
Outline

- ECSE Graduate Program People.
- Overview of Doctoral Program.
- Doctoral Qualifying Exam (DQE).
- Doctoral Candidacy Exam (DCE).
- Thesis Defense Examination (TDE).
- Registration and Doctoral Plan of Study.
- Questions?
Prof. K.S. Vastola, Graduate Program Director
- JEC 6003, X6074, vastola@ecse.rpi.edu

Ronnie Rowe, Graduate Program Administrator
- JEC 6012, X2554, rower@rpi.edu
- Student Services, Mgr. Grad Admissions & Aid.

Priscilla Magilligan, Graduate Program Administrative Assistant
- JEC 6012, X6225, pris@ecse.rpi.edu
- Priscilla is your starting point for all grad program matters, especially forms.
ECSE offers a PhD in Electrical Engineering OR in Computer and Systems Engineering.

EE vs. CSE doesn’t matter in any degree requirements, just area of research:

- **EE**
  - Microelectronics
  - Electronic Materials
  - Electromagnetics
  - Nanotechnology
  - Energy
  - Power Electronics
  - Photonics

- **CSE**
  - Computer Systems
  - Computer Graphics
  - Computer Networks
  - Wireless Networks
  - Networks
  - Robotics
  - Imaging

- **Either**
  - Controls
  - Signal Processing
  - Telecommunication
  - Computer Hardware
  - Electronic Circuits
  - Energy Systems

September 2, 2015
Why Get a PhD?

❖ Short answer: Because you want to do the kind of work that PhD’s do.

❖ Primarily, this means Research (with a capital R).

❖ It could be as a professor at a university, or as a research staff member in a government lab, or in industry.

❖ Not good reasons: “My parents will be impressed.”
  ■ “My friends will be impressed.”
  ■ “I will be impressed.”
  ■ “I don’t feel like getting a real job just yet.”
Major Steps to a PhD

1. Find a Research Advisor and start doing research.
2. Submit a Doctoral Plan of Study.
3. Take the Doctoral Qualifying Exam (DQE)
   - In 2nd semester if admitted with Masters,
   - In 3rd semester if admitted with only BS.
4. Form Doctoral Committee.
5. Pass Doctoral Candidacy Exam (DCE).
Doctoral Qualifying Exam (DQE)
DQE

- The purpose of the DQE is to determine the potential that you will be able to complete the Doctoral requirements, including original and independent research of high quality.
- The DQE consists of 3 Parts:
  - 4 Oral Exams: 1 Basic Area Exam, 2 Major Area Exam, 1 Minor Area Exam.
  - Course Grades: Your grades in courses taken at RPI. This serves as the “written” part of the DQE.
  - Research Advisor’s Recommendation: Your Thesis Advisor will submit a written evaluation of your research so far.
DQE Step 1: Choose Areas

- **Basic Exam**: One area from the **Basic Group**.
- **Major Exams**: One area from the **Elective Group**.
- **Minor Exam**: One area from the **Basic or Elective Group**, not previously selected.

**Basic Group**
1. Physics
2. Mathematics
3. Computer Science

**Elective Group**
4. Circuits and Electronics
5. Control
6. Communications
7. Plasmas & Electromagnetics
8. Microelectronics Technology and Design
9. Computer Systems
10. Computer Design
11. Image Analysis & Computer Vision
12. Electric Power Eng’g
DQE Step 2: Submit the application for the DQE to Priscilla in JEC 6012.

- **Application Deadline this semester:** Wednesday, September 9th by NOON.

DQE Step 3: The GPD assigns ECSE faculty to examine you in the areas you selected.

- Your advisor cannot be one of your examiners.
- If you need to take it a 2nd time, you will get new examiners, if possible.
The DQE Process: Steps 4 & 5

- **DQE Step 4:** You and each Faculty Examiner schedule a time for that Exam during the Examination Period.
  - You can try to schedule each exam as you wish within the constraints of the Examiner’s schedule.

- **DQE Step 5:** The 4 Oral Exams are given over a 2-week period.
  - **Examination Period:** Monday, September 21 – Friday, October 2, 2015 (inclusive).
  - Each Exam is approximately 1 hour.
  - You may be given written or oral questions.
Your examiner grades the Oral Exam according to the following categories:

i. Knowledge of Subject Matter;
ii. Ability to Analyze Problems and Formulate Solutions;
iii. Performance in Correctly Responding to Questions.

Point Values given by examiner for each of above:
5: Representative of RPI’s Best Doctoral Students;
4: Representative of a Good Doctoral Student;
3: Typical of a Marginally Adequate Doctoral Student;
2: Less than Expected of a Doctoral Student;
1: Definitely Inadequate Performance.
Examiner Input, Part 2

- Your Examiner then provides written comments on your performance and the likelihood that you will be able to complete the research requirements for the Doctorate.
- Your Examiner recommends (either “Yes” or “No”) that you pass your individual Exam.
Your Research Advisor provides the following evaluation of your research work to date:

i. Self-Reliance or Ability to Work with Minimum Supervision;
ii. Creativity or Ability to Come Up with Original Ideas;
iii. Motivation and Dedication to Accomplishment;
iv. Ability to Communicate in Writing.

Point Values: The same 1–5 pt. scale as the Oral Exams, or, possibly, “Unable to give a score at this time.”

Your Research Advisor comments on the likelihood that you will be able to complete the requirements for a doctorate.
Course Grades

- A list of grades that you have received at Rensselaer as a graduate student is included in the information provided to the ECSE Faculty at the meeting where passing is determined by a vote of the faculty.

- The faculty also have access to your student files should questions arise.
The Decision

- The ECSE Faculty meet to discuss each student including the results of these Oral Exams, the Course Grades, and the Research Advisor Recommendation.

  - This year’s Faculty Review Meeting will be held Wednesday, October 7th.
  
  - You will be notified in writing on October 8th.

- If you do not pass the first time, you will be able to take the DQE one more time, in the next semester.
The scores of typical students will look like this:

<table>
<thead>
<tr>
<th>Student</th>
<th>Basic</th>
<th>Major 1</th>
<th>Major 2</th>
<th>Minor</th>
<th>Total</th>
<th>Research</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>F</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane PhD</td>
<td>1/KC 4</td>
<td>6/BS 4 5</td>
<td>6/KV 3 4</td>
<td>2/KK 4 3</td>
<td>44</td>
<td>IB 3 2 4 3</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td>Joe PhD</td>
<td>2/JC 4</td>
<td>8/YL 4 5</td>
<td>8/LP 3 3</td>
<td>7/AA 2 3</td>
<td>39</td>
<td>IB 3 2 4 3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td>3.7</td>
</tr>
</tbody>
</table>

Research is an important aspect of the doctoral program and significant engagement in research activities should occur before taking the DQE.

Passing the DQE has a tight linkage to a Research Assistantship.

The exam is given twice per year: once in September, once in February.

You can take the DQE at most twice.
Doctoral Committee
Your Doctoral Committee must be formed before the DCE, preferably well before, with the advice of your advisor and the consent of the members.

- It must be approved by the GPD & Grad School.
- Your advisor will be the chair of your committee.
- If your advisor is not a full-time tenure-track faculty in ECSE, then you must have a co-advisor who is.
- The Committee must have 4 members including at least 3 full-time tenure-track RPI faculty members, and one member not from ECSE.
- The typical committee has 3 from ECSE and one from another department or outside RPI.
Doctoral Candidacy Exam (DCE)
After forming your Doctoral Committee.

Prepare a written Thesis Proposal which includes
- Concise discussion of the proposed thesis effort,
- In-depth review of the pertinent literature,
- Preliminary results which suggest that the effort will be successful.
- Typically 25-50 pages.

Arrange a date for the DCE with your Committee.

Distribute the Proposal to your Doctoral Committee at least one week before the exam.
The DCE is an Oral Exam conducted by your Doctoral Committee.

The format of the exam is determined by the committee, but typically involves a presentation by the student of approximately 45 minutes followed by questions to the student from the committee.

Can be taken any time after passing the DQE.

Should be completed by the semester when 45 of the required 60 credits beyond the masters are completed, typically the 4th semester after the masters.
Thesis Defense Examination (TDE)
Present and defend your thesis research before your Doctoral Committee and the public.

The TDE should be held by the deadline listed in the Academic Calendar for that semester.

Your Doctoral Committee signs the Record of Dissertation Examination form (assuming the thesis is acceptable).

Submit your final thesis to the Grad School.

Note: Read about plagiarism on Grad School website!

Pay any outstanding fees and parking tickets.
Recommended times for completing milestones:

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Semester (from BS)</th>
<th>Semester (from MS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find Advisor</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Plan of Study</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Take DQE</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Form Committee</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Pass DCE</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Thesis Defense</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Finish</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

“Semester” here refers only to fall and spring.
## Deadlines for Doc Prog

Required times for completing milestones:

<table>
<thead>
<tr>
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<th>Semester (from BS)</th>
<th>Semester (from MS)</th>
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<tr>
<td>Take DQE</td>
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<td>2</td>
</tr>
<tr>
<td>Form Committee</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Pass DCE</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Thesis Defense</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>Finish</td>
<td>14</td>
<td>10</td>
</tr>
</tbody>
</table>

Deadlines can be extended, but **only** with special permission.
Registration and Doctoral Plan of Study (PoS)
Per Semester Load:

- Minimum 12 Credits, Maximum 15 Credits
  - Full time, including RAs!
  - Only Exception: TA minimum = 9 credits.
  - All graduate students should take 15 credits every semester until their last.
General Requirements

- 90 Credit-Hour Plan of Study (PoS)
  - Approved by Advisor & GPD.
- Pass DQE.
- Pass DCE.
- Written Thesis & Defense, approved by your Doctoral Committee.
- Minimum 3.0 GPA.
Plan of Study (PoS)

- Need to submit your PoS (and all other grad program forms) directly to Priscilla.
- If you are a first semester grad student, you should do this within the next 2 months.
- Everyone else should have one on file already.
- You can revise and update as necessary.
- The official Institute PoS Form is on the Office of Graduate Education (Grad School) Web site.
- Remember for Doctoral students:
  - Academic Advisor = Research Advisor.
Questions?