Computer Science
Independent Work

Fall 2016
Andrea LaPaugh
Robert Fish
Colleen Kenny-McGinley
Welcome!

Robert Fish
IW Coordinator
rfish@cs.princeton.edu
206 Computer Science

Andrea LaPaugh
IW Coordinator
aslp@cs.princeton.edu
304 Computer Science

Colleen Kenny-McGinley
Undergrad Coordinator
ckenny@cs.princeton.edu
210 Computer Science
Outline for This Session

- Overview of independent work in COS
- Details of important steps and deadlines
- Pointers to where to get more info and help
Let’s get started ...
What Is Independent Work?

Individual project to study a novel idea in depth

- Novel algorithm
- Novel system design
- Novel problem formulation
- Novel benchmark suite
- Novel proof of a theorem
- Novel application
- Novel investigation of a dataset
- Novel ...
Why Do Independent Work?

Study a topic in depth
- Dive into much more detail than could in a course

Learn important skills
- Technical writing, speaking, project management

Work closely with faculty
- Meet weekly, get advice, get to know them, etc.

Do something interesting to talk about in ...
- Grad applications, job interviews, etc.

Have Fun!!!
Types of Independent Work

One semester project
- All AB juniors and some BSE juniors/seniors
- Project designed for one semester, but can be followed by related project in later semester
- IW seminar or individual advising

Two-semester thesis
- All AB seniors and some BSEs
- Project designed for full year
- Individual advising
IW Seminars

Same as one semester projects, but students work on related topics and meet with adviser together

- Enables collaborative projects
- Enables sharing of infrastructure
- Enables feedback to/from other students

Targeted at first-time IW students

- Provides more help on how to choose good projects, how to manage time, how to design talks, how to write papers, etc.
Important Steps and Deadlines

One semester projects:

- Oct 5: Written project proposal due
- Oct 24: Checkpoint form due
- Nov 17: “How to Give an IW Talk” session*
- Dec 1: “How to Write an IW Paper” session**
- Dec 12-16: Oral final presentation
- Jan 10: Written final report
- Jan 12: Poster session

* At 7:30PM in CS 105
**At 12:30PM in CS 105
Important Steps and Deadlines

Two semester thesis:

- Oct 5: Written Project Proposal
- Oct 24: Checkpoint Form
- Nov 6: “How to Give an IW Talk” session*
- Dec 1: “How to Write an IW Paper” session**
- Dec 12-16: Oral progress presentation
- Feb 8: Select a Second Reader
- Mar 1: Submit a Draft Paper

*At 7:30PM in CS 105
**At 12:30PM in CS 105
Questions so far?
On to the specifics ....
Important Steps and Deadlines

One semester projects:

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Written Project Proposal

Submit written description of your project plan

Logistics:

- Due Oct 5th
- 1-2 page paper
- Submit PDF document via CS dropbox
Written Project Proposal

- Motivation and goal
  “The goal of my project is ...”
- Related Work
  Survey of prior work with similar goals
- Approach
  Key novel idea
- Implementation plan
  Things you plan to implement. How you plan to do it.
- Evaluation plan
Checkpoint Form

Write short summaries of what’s done in first half and what’s planned for second half

Logistics:
- Due Oct 24th
- Write two paragraphs
- Get feedback from adviser
- Submit via online web form
Oral Presentation

Give an 9 minute talk about what you’ve done over the whole semester

Logistics:

- Dec 12-16th (last week of classes)
- Attend “How to Give an IW Talk” on Nov 17th
- Sign up for one hour time slot via WASS
- 5-6 talks per hour
- Submit slides via CS dropbox the night before
- Give your talk, watch others, provide feedback
Oral Presentation

- Motivation and goal
  “The goal of my project is ...”

- Related Work
  Survey of prior work with similar goals

- Approach
  Key novel idea

- Implementation
  Things you implemented. How you did it? What remains to be done.

- Evaluation

- Discussion
  Conclusions. Limitations. Future work.
Submit a written description of your project, including results and conclusions

Logistics:

- Due Jan 10th
- Attend “How to Write an IW Paper” on Dec 1st
- Submit PDF report via CS dropbox
- For one semester projects:
  - 20-25 pages double-spaced + appendix
- For theses:
  - 40-50 pages double-spaced + appendix
Written Final Report

- Motivation and goal
  “The goal of my project is ...”

- Related Work
  Survey of prior work with similar goals

- Approach
  Key novel idea

- Implementation
  Things you built. How did you do it? What remains to be done.

- Evaluation

- Discussion
  Conclusions. Limitations. Future work.
Poster Session

Present a poster describing your project to other students, faculty, and visitors

Logistics:

- In Convocation Room on Jan 12\textsuperscript{th}
- Submit PDF posters via CS dropbox
- Present posters on 4x4 bulletin boards
- Live demos, videos, props, etc.
- Best poster awards!
Poster Session

See examples on bulletin boards of department
Important Steps and Deadlines

Two semester thesis:

- Oct 5: Written Project Proposal
- Oct 24: Checkpoint Form
- Nov 6: “How to Give an IW Talk” session*
- Dec 1: “How to Write an IW Paper” session**
- Dec 12-16: Oral progress presentation
- Feb 8: Select a Second Reader
- Mar 1: Submit a Draft Paper

*At 7:30PM in CS 104
**At 12:30PM in CS 104
Second Reader Form

Select a member of the Princeton faculty to be the “second reader” (for thesis projects only)

Logistics:

- Due Feb 8th (Friday)
- Link to form accessible online
  https://iw.cs.princeton.edu/portal/
Second Reader Form

Please refer to independent work website for more information about this form.

Name* 

Advisor* 

Project title* 

Who will be your second reader? 
Note that your second reader will receive an email letting them know you selected them.

☐ My second reader is not listed above

☐ I confirm that my second reader has agreed to be a second reader for my thesis (you must get confirmation before submitting this form)

Submit

https://iw.cs.princeton.edu/portal/
Draft Paper

Submit a draft for at least the first few sections of written report (thesis projects)

Logistics:

- Due Mar 1st
- At least 4-5 pages single-spaced
- Submit PDF file via CS dropbox
Some more logistics ....
IW Portal

https://iw.cs.princeton.edu/portal/
Funding

Project-related expenses:
- Unusual hardware, software, data sets, etc.

Available funds:
- School of Engineering and Applied Science
  Expect email soliciting proposals soon
  Support up to $500 or so

- Student Activities Funding Engine (SAFE)
  http://www.princeton.edu/studentfunding/
Collaboration

“Independent work”
- Every student must do his/her own project

Collaboration
- Multiple IW projects can be synergistically part of a larger effort, either with other IW students or grad students
- Each student must carve out a distinct part with a clear goal, novel idea, evaluation methodology, etc.
- Each student must submit his/her own work
- Each student will be graded separately
Grading

Grades will depend upon:

- **Student initiative and contribution**: the creativity and originality of student ideas
- **Student progress**: content, amount of work accomplished to date, clarity and polish of presentations
- **Student presentation and paper**: the content, eloquence, organization and clarity

Majority of grade will depend upon quality of work

- But, poor presentation and/or poster, and missing checkpoints will also have an impact
Grading

A-level
- New contribution – interesting, creative
- Solid execution and results – refined and tested
- Excellent papers, talks, and posters – thoughtful, thorough

B-level
- Not-so-innovative contribution – variant of previous work
- Working execution and results – not fully refined and tested
- Complete papers, talks, and posters – limited insights

C-level
- Not innovative
- Unfinished or not working implementation
- Report looks like workbook or lab report

D-level
- Nothing interesting attempted, nothing gained
- Report is stream of consciousness
Common Mistakes

Delay project planning until last minute
■ Get started right away

Postpone meetings with your adviser
■ Try to meet once/week, even if it’s a brief meeting

Allow yourself to get stuck
■ Talk to your adviser; don’t avoid them when you are stuck
■ TA’s are assigned to every seminar, use them!

Put off work until the end of the semester
■ Work consistently during the semester (10 hrs/week min.)

Prepare papers and presentations at the last minute
■ Iteratively refine. Get feedback from your adviser.
If You’re Having Trouble...

Let us know...

Examples:

- Expect to miss a deadline
- Problems with your adviser
- Problems with your project
- Other factors in your life

If you tell us early, we might be able to help you
- We can direct you to the right person

Fixing problems post facto may be much harder
- Often involves Deans, etc.
Who/What You Can Ask

Adviser
- Anything research related
- Not: can I skip the project proposal or poster or write-up

IW Coordinator (Profs Fish and LaPaugh)
- Anything about mandatory requirements
- Not: is this research interesting

Undergrad coordinator (Colleen Kenny-McGinley)
- Anything about dates, forms, funding, etc
- Not: can you give me an extension
How to Ask Questions

Piazza – Primary Resource


- Ask IW staff and other students questions about logistics, advice, toolkits, data sets, etc.
Where to Find More Information

Web site:

- Important steps and deadlines
- Guidelines and useful information

These slides are linked from there
That pretty-much covers it. Let’s summarize the key points ....
My Thoughts on IW at Princeton

This is your chance to do an in-depth project on a novel topic of your own choosing

- It doesn’t get better than this
- It’s probably why you came to Princeton
- It’s certainly what you’ll most remember from your academics at Princeton

So, take the initiative and be awesome!
What to Do Today?

Read everything on the web site

- Read through the guidelines and useful information
- Take note of important deadlines
- Schedule weekly meetings with your adviser
What to Do In September?

Work diligently to develop your project plan
- Work hard to define a specific goal
- Understand all related work
- Articulate what makes your project novel
- Know what software and data you will use
- Have a good idea of what you need to implement
- Have a specific plan to evaluate your results

Write your project proposal early, get feedback, and refine multiple times
But the Semester Just Started!

The first few weeks are really important ...

- A good project plan is the key to success
- It takes time to understand related work, relevant software, and available data sets
- It takes iteration and refinement (multiple meetings with your adviser) to define a good project goal and novel approach
- Working hard in the first few weeks greatly reduces the chances of ending up with a weak project
OK, that’s it.
Thanks!!!