WELCOME!

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OUTLINE FOR THIS SESSION

- Outstanding IW Awards – Fall 2023
- Overview of independent work in Computer Science
- Details of important steps and deadlines
- Resources for more information and help
CONGRATULATIONS!

Fall 2023 Outstanding Independent Work

Brandon Cheng  
*Business Resilience: Investigating Changes in Company Language During Crises*

Adviser: Christiane Fellbaum

Jessica-Ann Ereyi  
*Python for the Java Programmer*

Adviser: Robert Fish

Meghan Harrington  
*Visualization Tool for Space- and Time-Oriented Phylogenetic Trees*

Adviser: Ben Raphael

Arnav Kumar  
*ViewDiff: Generating Novel Views for Complex Scenes with a 2D-only Diffusion-Based Approach*

Adviser: Felix Heide

Sarah Pedersen  
*Does Gen Z have a “privacy paradox?” Surveying Cross-Generational Understandings of Online Privacy*

Adviser: Mihir Kshirsagar

Evan Wang  
*CompGPT: Probing the Compositional Understanding of Visual Language Models*

Adviser: Felix Heide
LET’S GET STARTED!
What Is Independent Work?

- **Independent Work (IW):** An individual project to study an idea in depth.

- **Examples:**
  - Algorithm
  - System design
  - Problem formulation
  - Benchmark suite
  - Proof of a theorem
  - Application
  - Investigate a dataset
  - Etc…
Why Do Independent Work?

- Study a topic in depth
  - Dive into much more detail than is possible 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

- **Spring One-Semester Project**
  - All AB juniors and some BSE juniors/seniors
  - Designed for one term, but can be followed by a related project in a later semester
  - IW seminar, or one-on-one/individual advising

- **Two-Semester/Thesis**
  - All AB seniors and some BSE juniors/seniors
  - Designed for a full year
  - One-on-one/individual advising
IW Seminars

- Same as one-on-one projects, but students work on related topics and meet with an advisor 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: Spring 2024 Projects

- February 15: SEAS Funding Application due by 5:00pm
- February 22: Written Project Proposal due, 11:59pm
- March 9: Checkpoint Form due, 11:59pm
- March 26: Attend How to Give an IW Talk
- April 9: Attend How to Write an IW Paper
- April 14: Oral Presentation Slides & Link to Video due, 11:59pm
- April 28: Written Final Report due, 11:59pm

https://www.cs.princeton.edu/ugrad/independent-work/important-steps-and-deadlines
QUESTIONS
SO FAR?
Onto the specifics...
Submit a written description of your project plan

Logistics:
- Due February 22, 11:59pm Eastern
- 1-2 page paper
- Submit PDF document via IW portal
Written Project Proposal
(Continued)

- 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
- Evaluation Plan
  - Experiment design, data, metrics, comparisons
Write a short summary of what is done in the first half, and what is planned for the second half.

Logistics:
- Due March 9, 11:59pm EDT
- Write two paragraphs
- Submit via IW portal
- Get feedback from advisor
Checkpoint Form

Progress to date:

Current difficulties:

Next steps:
Oral Presentation

- Give a **nine-minute** talk about what you’ve done over the whole semester
  - Required for all seminar students, and any first-time BSE students.

Logistics:

- Attend “How to Give an IW Talk” on March 26
- Submit slides and video link via IW portal by April 14 at 11:59pm
  - Note: You must submit your FULL slide deck by the deadline above
Video-recorded oral presentations

- Record your oral presentation via Zoom, or
- Select another way to record your oral presentation (Loom, etc.)

Save your recording either on Zoom or in Google Drive

- Submit a link to your recording to the IW portal

Submit a pdf of your slides to the IW portal

Seminar students: your instructor may ask you to practice or present in your group meeting, as well

One-on-one students: your adviser may ask you to present to their research group, as well
Oral Presentation (Continued)

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

- Evaluation
  - Experiment design, data, metrics, comparisons, qualitative results, quantitative results, further results needed

- Discussion
  - Conclusions, limitations, future work
Written Final Report

- Submit a written description of your project, including results and conclusions

Logistics

- Due April 28 by 11:59pm
- Attend “How to Write an IW Paper” on April 9
- Submit PDF via IW portal
- 20-25 pages, double-spaced, plus appendix

Final papers submitted after 11:59pm on the due date will be assigned a 1/3 grade deduction.
Written Final Report (Continued)

- 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
  - Experiment design, data, metrics, comparisons, qualitative results, quantitative results, further results needed
- Discussion
  - Conclusions, limitations, future work
Additional Important Information
https://iw.cs.princeton.edu/portal

Manage your independent work

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<th>Fish, Robert</th>
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### Funding

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

**Available funds:**
- School of Engineering and Applied Science
  - Requires an adviser signature, **don’t procrastinate!**
  - Support up to ~$500 or more with justification ($300 max for cloud computing services)
- Open to ANY computer science student
- Student Activities Funding Engine (SAFE)
  - [http://www.princeton.edu/studentfunding](http://www.princeton.edu/studentfunding)
**Collaboration**

- **INDEPENDENT Work**
  - Every student must do their 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 their own work
  - Each student will be graded separately
Grading

- IW must be taken for a grade
- Grades are recommended by instructor, confirmed by IW Coordinators

Grades will depend upon:

- **Student initiative and contribution**: the creativity and originality of student ideas and/or degree of technical challenge undertaken
- **Student progress**: content, amount of work accomplished to date, clarity and polish of presentations
- **Student presentation and paper**: content, eloquence, organization and clarity
 Majority of grade will depend upon quality of work
  ▶ But, poor presentation and/or missing checkpoints will also have an impact

 Final papers submitted after 11:59pm on the due date will be assigned a 1/3 grade deduction.
Grading (Continued)

A-level

- Clear contribution – interesting, creative
- Solid execution and results – refined and tested
- Excellent talks, papers – thoughtful, thorough
- Student has taken initiative and led project

B-level

- Not-so-innovative – possibly obvious from previous work
- Working execution and results – not fully refined and tested
- Complete papers and talks – limited insights
Grading (Continued)

- **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

Mistake: Delaying project planning until last minute
Instead: Get started right away

Mistake: Postponing meetings with your advisor
Instead: Try to meet once a week, even if it’s a brief meeting

Mistake: Allowing yourself to get stuck
Instead: Talk to your advisor; don’t avoid them when you are stuck

TA’s are assigned to every seminar. Use them!
Mistake: Putting off work until the end of the semester

Instead: Work consistently during the semester (10 hours per week, minimum)

Mistake: Preparing papers and presentations at the last minute

Instead: Iteratively refine. Get feedback from your advisor.
If You’re Having Trouble…

Examples:
- If you expect to miss a deadline
- If you have problems with your advisor
- If you have problems with your project
- Other factors in your life (e.g. illness, death in the family, etc.)

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.

LET US KNOW!
Who/What You Can Ask

Your Advisor:
- Anything research related
- Not: “Can I skip the project proposal or final paper?”

IW Coordinators (Dr. Fish, Dr. Kincaid)
- Anything about mandatory requirements
- Not: “Is this research interesting?”

IW Administrator (Mikki Hornstein)
- Anything about dates, forms, funding, etc.
- Not: “Can you give me an extension?”
How to Ask Questions

Canvas/Ed – Primary Resource

- https://princeton.instructure.com/courses/14676
- Ask IW staff and other students questions about logistics, advice, toolkits, data sets, etc.

Email Mikki

- mhornstein (@princeton.edu)
Where to Find More Information

IW Website:

  - Important Steps and Deadlines
  - Guidelines and Useful Information

Note: These slides will also be available on the website and Canvas
That pretty much covers it.

Let’s summarize the key points…
Immediate Next Steps

- Look over the IW website, and be aware of important upcoming deadlines
  - Important Steps and Deadlines
  - Guidelines and Useful Information
- One-on-one students: Schedule weekly meetings with your advisor
What to Do in January/February?

- 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 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 advisor) 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
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 remember most from your academic career at Princeton

Take the initiative and BE AWESOME!
THANKS!

Any questions?