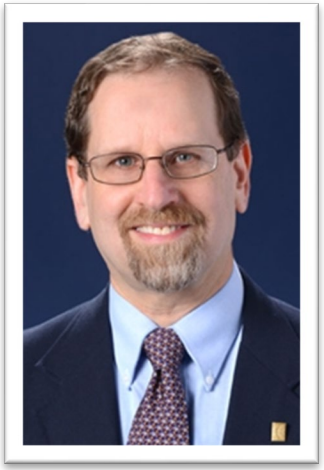
GETTING STARTED: COMPUTER SCIENCE INDEPENDENT WORK

FALL 2026

DR. ROBERT FISH, DR. AARTI GUPTA,
& MIKKI HORNSTEIN

WELCOME!



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OUTLINE FOR THIS SESSION

- Outstanding IW Awards – Spring 2026
- Overview of independent work in Computer Science
- Details of important steps and deadlines
- Resources for more information and help

CONGRATULATIONS!

Best Spring 2026 Independent Work

Nicholas Budny, AB'27
In-context learning of successor representations
Adviser: Jonathan Cohen

Veronica Kuo, AB'27
Leveraging LLM Metacognition to Generate Curricula for Human Learners
Adviser: Tom Griffiths

Jishnu Roychoudhury, BSE'27
FlashJVP: Fast and Memory-Efficient Forward-Mode Differentiation of Attention on Hopper
Adviser: Tri Dao

Tomasz Sadowy, BSE'27
Semantic Emergence in Diffusion Models: Probing Attribute Formation for Temporally Informed Steering
Adviser: Vikram Ramaswamy

Annika Yeh, BSE'27
Probability-Based Extraction of Vegetation from Archival Aerial Photography: Mapping Long-Term Socioenvironmental Change in Namibia
Adviser: Xiaoyan Li

Shirley Yu, BSE'27
Spectral-Gated Test-Time Adaptation for Foundation Time-Series Models under Regime Shifts
Adviser: Elad Hazan



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

- Fall Term Project
  - Some AB juniors
  - Some BSE juniors/seniors
  - Designed for one term, but can be followed by a related project in a later term
  - IW seminar, or one-on-one/individual advising
- Thesis Project
  - All AB & some BSE 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: Fall 2026 Projects

- September 17: Written Project Proposal due, 11:59pm
- September 25: SEAS Funding Application due, 5:00pm
- October 15: Checkpoint Form due, 11:59pm
- November 3: Attend How to Give an IW Talk (required for all first-time IW students)
- November 10: Attend How to Write an IW Paper (required for all first-time IW students)
- November 30: Oral Presentation Slides & Link to Video due, 11:59pm
- December 10: Written Final Report due, 11:59pm*

(*Note: This is MUCH earlier than in past fall terms, based on a change in the university calendar.)

https://www.cs.princeton.edu/ugrad/calendar-and-requirements

Important Steps and Deadlines: Thesis Projects, Fall 2026

- September 17: Written Project Proposal due, 11:59pm
- September 25: SEAS Funding Application due, 5:00pm
- October 15: Checkpoint Form due, 11:59pm
- November 3: Attend How to Give an IW Talk*
- November 10: Attend How to Write an IW Paper*
- November 17: Second Reader due, 11:59pm
- December 10: Midpoint Thesis Report due, 11:59pm

*Note: “How-to” meetings are required for all thesis students who have never previously completed IW and optional for all other thesis students.

https://www.cs.princeton.edu/ugrad/calendar-and-requirements

Important Steps and Deadlines: Thesis Projects, Spring 2027

February 12:	SEAS Funding Application due, 5:00pm
February 18:	Written Draft Paper due, 11:59pm
March 16:	Attend How to Give an IW Talk (optional refresher)
March 24:	Attend How to Write an IW Paper (optional refresher)
April 15:	Thesis Written Final Report due, 11:59pm
April 18:	Oral Presentation Slides due, 11:59pm
April 19-23:	Oral Presentation Week (schedule a time with your adviser to give a live oral presentation)

https://www.cs.princeton.edu/ugrad/calendar-and-requirements

QUESTIONS SO FAR?



Onto the specifics…

Written Project Proposals

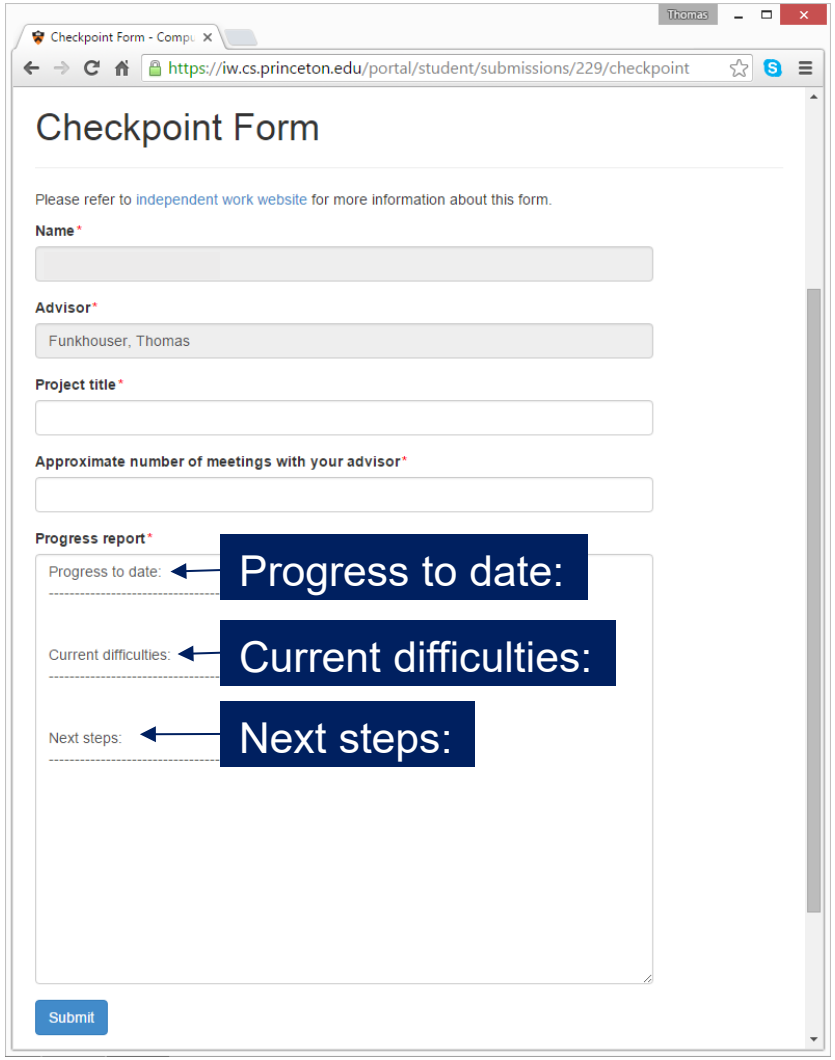
- Submit a written description of your project plan
- Logistics:
  - Due September 17, 11:59pm
  - 1-2 page paper
  - Submit PDF document via IW portal

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

Checkpoint Form

- Write a short summary of what is done in the first half, and what is planned for the second half
- Logistics:
  - Due October 15, 11:59pm
  - Write two-three paragraphs
  - Submit via IW portal
  - Get feedback from advisor


Thomas
Checkpoint Form - Compu
https://iw.cs.princeton.edu/portal/student/submissions/229/checkpoint
Checkpoint Form
Please refer to independent work website for more information about this form.
Name*
Advisor*
Funkhouser, Thomas
Project title*
Approximate number of meetings with your advisor*
Progress report*
Progress to date:
Current difficulties:
Next steps:
Progress to date:
Current difficulties:
Next steps:
Submit

Oral Presentation
(Fall-Term IW Students Only)

- Give a **nine-minute** talk about what you've done over the whole term.
- Logistics:
  - Attend "How to Give an IW Talk" on November 3.
  - Submit slides and video link via IW portal by November 30 at 11:59pm.
    - Note: You must submit your FULL slide deck by the deadline above.

Oral Presentation (Continued)

- 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
  - Set privacy so that anyone with the link can access the video
- 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
(All students)

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

Fall Term IW

- Due December 10 by 11:59pm
- Attend “How to Write an IW Paper” on November 10
- Submit .pdf via IW portal
- Approximately 20-25 pages, double-spaced, plus appendix

Senior Thesis

- Due April 15 by 11:59pm
- Attend “How to Write an IW Paper” on November 10
- Submit .pdf via IW portal
- Approximately 40-50 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 Requirements for Thesis Students

Second Reader Form
(Thesis students only)

- Select a member of the Princeton faculty to be a second reader on your project
  - Second readers review your project and provide input on your grade
- Logistics:
  - Due in IW portal on November 17 by 11:59pm
    - Start asking early!

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

Midpoint Thesis Report
(Thesis students only)

- Submit a draft of beginning sections of the written report.
- Logistics:
  - Due December 10 by 11:59pm
  - At least 5-10 pages
  - Submit .pdf via IW portal

Midpoint Thesis Report, Continued
(Thesis students only)

- Motivation and goal
  - “The goal of my project is…”
- Related work
  - Survey of prior work with similar goals
- Approach
  - Key novel idea
- Implementation Plan
  - What are your next steps?

Draft Written Paper
(Thesis students only)

- Submit a draft of most sections of the written report.
- Logistics:
  - Due February 18 by 11:59pm
  - At least 10-15 pages
  - Submit .pdf via IW portal

Draft Written Paper, Continued
(Thesis students only)

- 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?
  - Preliminary results, if available
  - Preliminary evaluation, if available

Spring Oral Presentation
(Thesis students only)

- Give a **live 12-minute** talk about what you've achieved over the course of the year
- Logistics:
  - Slides due in IW portal on April 18, 11:59pm
    - Oral Presentations Week, April 19-23
    - Set up a time to present live, in-person
      - **Must have at least two faculty members attend. Usually, your adviser and second reader.**

Spring Oral Presentation, Continued
(Thesis students only)

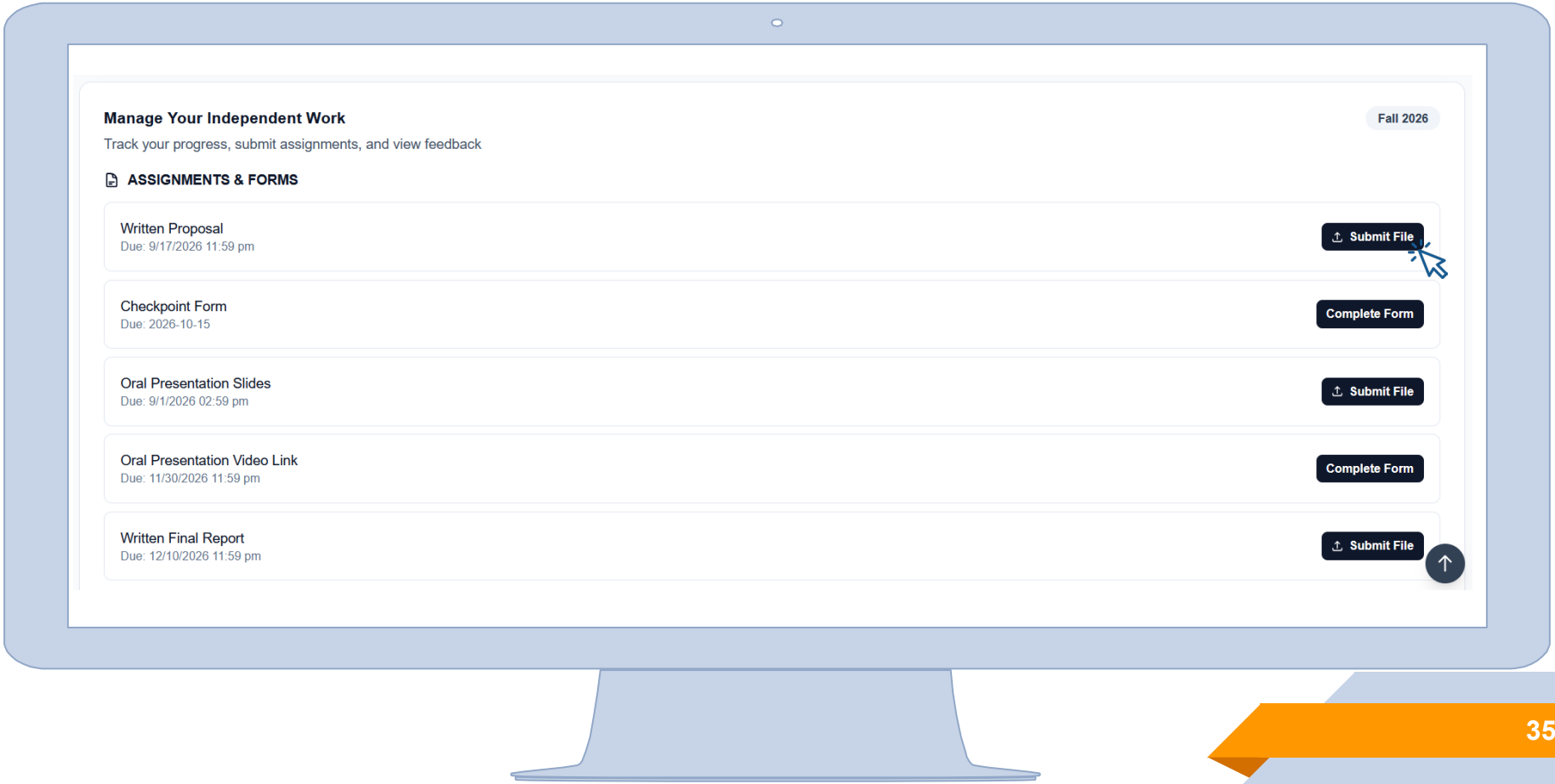
- More Logistics:
  - Counts as Senior Departmental Exam for AB Seniors
  - Attend “How to Give an IW Talk” on November 3
  - Utilize campus resources such as McGraw Center and Princeton Writes

Spring Oral Presentation, Continued
(Thesis students only)

- 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 you did it? 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

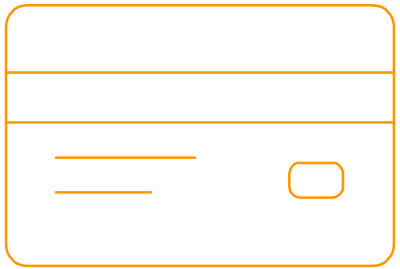


Use of Generative AI

- Each advisor or IW seminar leader will determine how and to what degree the use of AI tools for tasks such as writing, data set generation, coding support, etc. is allowed.

- In any case, all uses of AI tools shall be documented in class, student reports, presentations, code, and any other materials produced by the work.

Funding



- Project-related expenses:
  - Unusual hardware, software, data sets, etc.
- Available funds:
  - School of Engineering and Applied Science: Application due Septembe 25 by 5:00pm
    - Requires an adviser signature, **don't procrastinate!**
  - Support up to ~$500 or more with justification ($300 max for cloud computing services. Again, more with justification.)
  - Open to ANY computer science student
  - Student Activities Funding Engine (SAFE), for AB students
    - http://www.princeton.edu/studentfunding

Equipment

- Check out our COS IW & Thesis Library of Things before applying for SEAS funding toward physical equipment!
  - https://csguide.cs.princeton.edu/independent-work-hardware
- Examples of equipment we have on-hand for you to borrow:
  - Web cams, SmartThings motion sensors, dev boards, low vision simulation goggles, VR headsets, sewing machine, blood pressure monitors, and more!

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

Grading (Continued)

- Majority of grade will depend upon quality of work and presentation.
  - 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. No exceptions!**

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.
  - TAs are usually assigned to every seminar. Use them!

Common Mistakes (Continued)

- Mistake: Putting off work until the end of the term.
  - Instead: Work consistently during the term (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.



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. Gupta)
  - 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://edstem.org/us/courses/101645/discussion/8226407
  - 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:
  - https://www.cs.princeton.edu/ugrad/independent-work-thesis

- IW Handbooks:
  - AB Handbook: https://www.cs.princeton.edu/sites/default/files/2026-08/cos-ab-iw-handbook-2026-27.pdf
  - BSE Handbook: https://www.cs.princeton.edu/sites/default/files/2026-08/cos-bse-iw-handbook-2026-27_0.pdf

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, IW handbooks, and be aware of important upcoming deadlines.
- One-on-one & thesis students: Schedule weekly meetings with your advisor.
- Seminar students: Attend your seminar meetings.

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 Term 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.

Dr. Fish's 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?