Agenda

Research Topics
HW Live Review
Assignment
How to Find a Topic?

Read, read, read, discuss, go to talks

Listen to your advisor: sometimes you may not have a choice, but you can still bring small ideas
Let's say you are convinced you found a topic. You are excited.

How to know if we should pursue the topic?

Why do (PhD) research?
Research Formulation

What are you trying to do? Articulate your objectives using absolutely no jargon.

How is it done today, and what are the limits of current practice?

What's new in your approach and why do you think it will be successful?

Who cares?

Heilmeier
Research Formulation

If you're successful, what difference will it make?

What are the risks and the payoffs?

How much will it cost?

How long will it take?

What are the midterm and final "exams" to check for success?

Heilmeier
Other Approaches

Random
Top trends and lists
Interestingness
Parallels to Products

Research can be thought of as a Product

Product Viability Evaluation

Companies do this all the time

Let's look at some examples
Viability of Product Idea

1. What is the potential market size or demand?

2. Who are your competitors?

3. Is it a trend, fad, flat or growing market?

5. Who are your target customers?

6. What is your potential selling price?

Research vs Startups

What should you work on? Are you working on the right problem?

MVP.

Usually resource constrained and must prioritize.

Small team.

Selling process.

Marketing.

(Thanks to Guo)
Learning during Ph.D.

Topic or Process?
HW Live Review

Spend time discussing HW submissions
Volunteer to have your HW reviewed
We will review 1-3 submissions
Projected on the screen and discussed publicly
HW Live Review – Why?

Similar to Code Review
Public discussions
  Practice giving feedback
Opportunity to “improve” other work
  Practice editing skills
Get feedback from different views
  Not just professor or your sub-discipline
Live comments on HW1 submissions
HW2 - Research Formulation

What are you trying to do? Articulate your objectives using absolutely no jargon.

How is it done today, and what are the limits of current practice?

What's new in your approach and why do you think it will be successful?

Who cares?

Heilmeier
HW2 - Research Formulation

If you're successful, what difference will it make?

What are the risks and the payoffs?

How much will it cost?

How long will it take?

What are the midterm and final "exams" to check for success?

Heilmeier