

# How to Identify a Good Research Topic?

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## Overview

- **Finding a research topic**
- **Finding a dissertation topic**
- **Concluding remarks**

**(The content of this talk is gratefully inherited from my teachers and, whenever I was stupid enough not to ask them or not to listen to them, learned painfully over the years.)**

## Finding a research topic

**A hard problem, but some heuristics may help:**

**Subject candidate topics to four basic questions [Herb Simon]:**

**1. Will anybody care about the answer?**

**Is there any utility in answer? Sometimes we care about the answer even without utility (e.g., DNA structure, structure of the Universe).**

**2. Is this problem solvable within the given amount of time?**

**Is this the right time to start with it? Can I finish it in less than three to four years that it takes to write a dissertation?**

**3. Will I be the first to answer this question?**

**This includes the past, but we can insure ourselves by doing a good job on library search. Are other people working on it now?**

**4. Do I have good tools to address this question? Do I have a good chance to succeed**

## Finding a research topic

What makes me think I will be successful?

**“Because I’ m smarter than others”**

bad answer ... There are scores of smart people around.

**“Because I’ m a hard worker”**

better ... But everybody who wants to succeed works hard.

**“Because I have a secret weapon”**

**Much better!**

## Finding a research topic: Secret weapon

What is a secret weapon?

A comparative advantage over your competitors to glory:

- **A good problem that nobody has thought about before.**

Maybe you are the first to think about this problem because of personal experiences (e.g., Fleming, echo-therapy)? Don't look for research ideas in journal articles.

- **Special instruments, tools or a piece of knowledge that others don't have.**

Is there anything that I have around me? Powerful theoretical tools (e.g., Newton). Biggest, most powerful machine of a certain type (e.g., a powerful accelerator, an excellent networking lab). Software tools (e.g., GeNIe and SMILE).

- **Training in a discipline that other people are not trained in.**

What is my background? Can I combine my knowledge of music, my interests in biology, art, architecture, my concern about cancer or Alzheimer's disease, etc., with information science?

## Finding a dissertation topic

**Similar to the problem of finding a research topic, although you are not completely on your own here ...**

- **Listen to your advisor: He/she is (or should be) one of your secret weapons.**
- **What is (or is likely to be) funded? After all, you need to pay the rent and buy bread.**
- **What are the strengths of this group, department, school, university, city? Who are the people I can rely on (my other secret weapons).**
- **Be careful who you are listening to.**
- **Think, think, and once again think. This is what you do best.**
- **Play actively with the knowledge that you are gaining, lay links between facts, be critical and ask questions.**
- **Take a *real problem*, preferably with high payoffs, find a good solution, do something practical. Best research ideas come from real problems.**
- **Test market your ideas (spouse, friends, advisor, other faculty).**

## **Progression to the Thesis (PB)**

- **Stage I: Play with small ideas and small projects**
  - Start from your work with your advisor, other faculty, courses
  - Publish posters, short papers
  - Present, meet likeminded people, get feedback
  - Get a feeling how research works
- **Stage II: Explore larger project(s) of your own**
  - Something that you might be known for
  - Your ideas, your implementation
  - See how it works
- **Stage III: If [one of] these direction works, go for it**

## **Are you Ready to Proceed with Your Thesis**

- I. Your topic should be novel and interesting**  
...but you should make sure that it is correct for each of your topics
- II. The topic solid enough to produce a sizeable chunk of work**
  - Not a conference paper size, preferably not just a journal paper size
- III. This is the topic that you really like and excited to explore**
  - You will likely to work on it for at least 10 years
- IV. You are able to get good results working on this topic**
  - No results is a result, but it is much more work to produce a mature work



## **Concluding remarks**

- **Creativity is very important in finding research topics**
- **How do you become creative?**

**That's it**

