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Outline

Introduction

Characteristics of the Ideal Research Topic

- **The subject should be timely.** Previous groundwork should leave your research problem ripe for completion, and it should be in an active area with potential for future work and employment.

  On the other hand, if a field is too crowded, and the subject too prominent, then you risk being 'scooped' by a more experienced researcher who is able to work faster than you. In this case, you may be forced to start over again (rather disastrous) or at least publish jointly (possibly a blessing, but surely an inconvenience).

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- **Your work should lead to a well-defined set of results to which you can lay claim.** In particular, career prospects will be lessoned if you merely contribute a small piece of a very large project, a piece of software which is closely identified with a project, or is published with a long list of collaborators.

  On the other hand, it is impossible to work in a vacuum, and your task can be significantly harder if you don't have a group of people working on closely related problems with whom you can interact and share code.

Characteristics of the Ideal Research Topic

- **The best topics show a high level of creativity – and are often somewhat speculative.** It is often unclear at first how the ideas will develop.

  On the other hand, a multiyear plan of research is a very valuable asset.

Characteristics of the Ideal Research Topic

- **You should really enjoy the subject, and want to spend the next several weeks/months/years with it!**

  On the other hand, an ideal subject in a foreign subject is of no use without someone*s* who is willing to direct you in it.

Clearly some compromise is necessary here!

Getting an Idea

Active Readering and Listening

It is very important to make the transition from the passive mode of learning that traditional lecture courses encourage to an active and critical learning style. Whenever you read technical material, evaluate a piece of software, or listen to a research talk, ask yourself these canonical questions:

- From where did the author seem to draw the ideas?
- What exactly was accomplished by this piece of work?
- How does it seem to relate to other work in the field?
- What would be the reasonable next step to build upon this work?
- What ideas from related elds might be brought to bear upon this subject?

One technique that some find helpful is to keep a written log of your technical reading and listening. Review it periodically to see if some of the ideas begin to fit together.

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Exposure Yourself to Ideas

Set aside some time every week for trying to generate research ideas. Some possible catalysts are:

- Make a weekly trip to the library to read at least the abstracts from the premier journals in your eld. Choose an article or two to read in depth and critique.
- Make a weekly investigation to nd technical reports in your eld, using electronic resources or libraries. Read selectively and critique.
- Attend at a research seminar or colloquium series. Listen and critique.

Add these to your log, and ask the canonical questions. As you review the log 6 months from now, you may nd something that strikes a chord then but is beyond you now.
It is very important to make the transition from the passive mode of learning.

Directed Study

Which comes first: the thesis advisor or the thesis topic? The answer is, both ways work.

If you have identified a compatible advisor, you could ask for an independent study course. Both of you together set the focus for the course, with you having more or less input depending upon your progress in identifying a subfield of research.

Developing the Germ of an Idea

Once you have identified a topic that looks feasible, make sure you are aware of all of the literature in the area. Keep reading and listening, and keep distinct in your mind what is different between your work and others. If you do not frequently review the literature you read months ago, you may find yourself unconsciously claiming credit for other people's ideas.

On the other hand, don't let other people's frame of mind limit your creativity.

A Pitfall to Avoid

It is possible to spend almost all of your time in literature review and seminars.
It is easy to convince yourself that by doing this you are working hard and accomplishing something. The truth of the matter is that nothing will come of it unless your are an active reader and listener and unless you assign yourself time to develop your own ideas, too. It is impossible to 'finish a literature review and then start research.' New literature is always appearing, and as your depth and breadth increases, you will continually see new connections and related areas that must be studied. Active listening and reading must be viewed as 'education' that will involve you for the rest of your career.
Don't fool yourself into thinking it must be finished before you can begin research.

Choosing an Idea

From reading, interacting with your advisor during independent study, or work on a research assistantship, some possible projects will emerge. Make a list of open problems and possible projects that are of interest to you, and discuss them with potential advisors.