How to Select a Research Area & Advisor

Prelude

Note that the selection of research area, school, and advisor could be inter-dependent

There is no correct decision on these; everyone has different criteria

It's best to get as much information as possible (e.g., lab rotation) and make your own decision

What I will tell you today are my opinion; there are no fact in all these

Which Area?

Why it's important

- It's an area you would be working in for at least 2 years (of MS) plus x-years of PhD ($x = 1$ to ∞)
- Throughout the research career, one could change areas (e.g., John Guttag, Edsger W. Dijkstra, etc.), and should change areas, adapting to trends in research and society; but for obtaining a PhD, you stick to an area (i.e., to be an expert in that area)
- It has job implications

Selection Criteria

- ✗ Your *sustainable* interests, passion, and style
- ✗ Your skill sets (e.g., systems vs theory)

- ✗ Are there many important, unanswered questions in the field?
- ✗ Long-term potential: social impact and demand for not only now, but more importantly, when you graduate and beyond (i.e., what is the "next" hot field?)
- ✗ Are the professors in the field well-funded?

How Do I Know I Have Interests

- ✗ Did you take the basic undergraduate course?
- ✗ If so, was it interesting? Did you want to know more about the field?
- ✗ Remember, knowledge from the courses was the result of research

Check out their "playground"

- ✗ Attend the top conferences in the field, if possible
- ✗ At least browse the recent program of top conferences
- ✗ If interesting, read a few papers
- ✗ Do you envision authoring such "cool" papers?

Selecting a Research Problem

- After selecting an area (e.g., HCI, Software Engineering, Mobile Computing, etc.), must identify/select a research problem
- Initially you'll need help from your advisor and senior students
- You'll need to read a lot of good recent research
- Identify an important, new problem
- Or select an existing problem but propose a completely new solution methodology
- Be a leader, not a follower (don't pick a problem everyone else is working on)

Richard Hamming's "You & Your Research"

- ✗ What are the important problems in my field?
- ✗ "The average scientist does routine safe work almost all the time"
- ✗ "If you want to do great work, you clearly must work on important problems, and you should have an idea"
- ✗ "Most great scientists are completely committed to their problem"
- ✗ "The value is in the struggle more than it is in the result"

- ✗ Youtube link & transcript

Which School & Advisor?

Selection Process

If you decided on a research area, you need to decide on at which school and which advisor to do your research with

It's also ok to decide on a school and then select an area and advisor

- Hopefully the school you enrolled provides you with good options

School then Advisor? Or Advisor?

When I meet someone new in my field, they usually ask me who my advisor was

When I meet someone new outside my field, they usually ask me where I got my PhD from

Importance of School

- In general, you should carefully select your advisor and go to the school wherever s/he is
- But each school & department, as well as lab, has a culture, and you should find the one that fits you
- Great CS schools (e.g., MIT, Stanford, Berkeley, CMU, etc.) show extra prestige
- But of course there are many great labs outside those "top" schools

Overseas vs KAIST

- ✗ KAIST CS has internationally well known professors in most areas
- ✗ IMHO, unless you get admissions from top 10 schools, not sure you'll get better education than in KAIST
  - Some recent KAIST PhDs got good job offers from overseas
- ✗ International experience still quite invaluable

Importance of Advisor

- ✗ People recognize who you were trained by
  - S/he has major influence on your research style & career
  - You will forever be linked to your advisor
  - You're part of that academic tree
- ✗ Could also be your lifelong mentor
- ✗ Usually good lab-mates come with good advisor
- ✗ You could have access to your advisor's network

National Institutes of...

THE NINE TYPES OF PRINCIPAL INVESTIGATORS

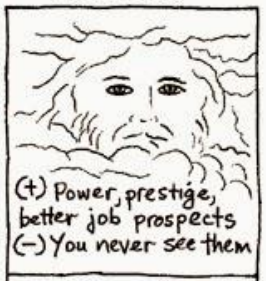
Big Talker

(+) Makes your data seem really important
(-) Doesn't really understand what you do

Slave Driver

(+) You get lots done
(-) You forget your spouses name

Demi God

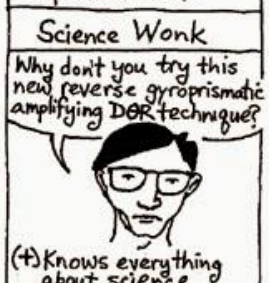


(+) Power, prestige, better job prospects
(-) You never see them

Control Freak

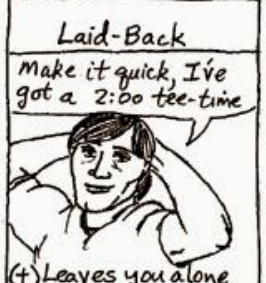
(+) Knows exactly what experiment you're doing
(-) Knows exactly what experiment you're doing

Science Wonk



(+) Knows everything about science
(-) He's a total geek

Laid-Back

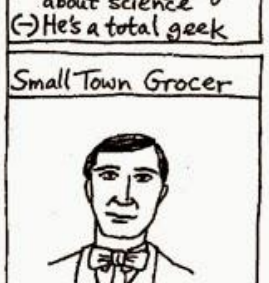


(+) Leaves you alone
(-) Doesn't care about your results

Psycho

(+) Keeps you on your toes
(-) Scary

Small Town Grocer



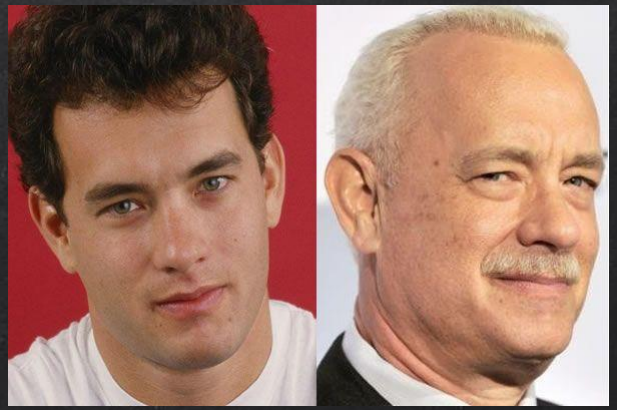
(+) Happy with his own little niche
(-) Little Ambition

Rising Star

(+) Exciting Ride
(-) Not much room for you

Criteria for Advisor Selection

- ✗ Does your research interest broadly match his/hers?
- ✗ Do you believe in his/her research philosophy?
- ✗ Do you believe in his/her education philosophy?
- ✗ How is s/he internationally recognized in the field?
- ✗ Is s/he your role model?
- ✗ Can s/he fund your research?
- ✗ Does s/he care about student's growth as a researcher and person?



Senior vs Young Faculty

Senior

- ✗ Visionary
- ✗ More experience and connections
- ✗ Mentor could be senior grad student
- ✗ Like a father/mother

Young

- ✗ Understands latest techniques
- ✗ Small lab ➔ more personal guidance
- ✗ What happens if s/he is denied tenure?
- ✗ Like a big brother/sister

Ben Barres – How to Pick a Graduate Advisor

- ✗ Topic-wise, start broad
- ✗ Pick an advisor who is a good researcher
- ✗ Pick an advisor who is a good mentor
- ✗ Are lab members happy?
- ✗ "The advisor's job is to provide a fun and exciting environment, to set a good example, and the rest must come from the heart of a student"

Link

Pick an Advisor Who is a Good Researcher

- ✗ Is s/he publishing in top conferences & journals?
- ✗ Do you find the papers well-written, rigorous, and interesting?
- ✗ Look at her/his CV

Pick an Advisor Who is a Good Mentor

- ✗ A good advisor spends lots of time with students
- ✗ Helpful suggestions vs micro-management
- ✗ Ask specific questions to current and former students
- ✗ See the list of protégés
  - How successful are they?
  - Where are they now?

- ✗ One of the metrics for evaluating a professor should be how successful their students are

There is no Perfect Answer

- ✗ Like all other important decisions in life, you wont' have perfect information
- ✗ You need to find what is "right" for *you*
- ✗ Visit the school, department, lab, and advisor
- ✗ The feeling must be mutual; s/he must also select you ☺
  - Always behave professionally
  - Professors share information just like students

- ✗ If you ever have a problem with your advisor and/or the lab, you should discuss it with your advisor

How to Contact a Professor

- ✗ Professors get LOTS of emails, so write a clear and concise email
- ✗ Have an informative subject line
- ✗ Be formal and polite
- ✗ Write ***why*** you want to join that lab (must be customized)
- ✗ Write why s/he should have you join the lab
- ✗ Attach your CV & transcript

Read this and this

We Will Have a Panel on Today's Topic

- Date: March 12th
- Please submit your questions by emailing i2r@nmsl.kaist.ac.kr

If you haven't Already, Fill Out the Survey!!!

http://bit.ly/i2r_survey