



HOW TO SELECT A RESEARCH AREA & ADVISOR

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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

- X It's an area you would be working in for at least 2 years (of MS) plus x -years of PhD ($x=1$ to ∞)
- X 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
- X But for obtaining a PhD, you stick to an area (i.e., to be an expert in that area)
- X It has job implications



SELECTION CRITERIA

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

- X Are there many important, unanswered questions in the field?
- X 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?)
- X Are the professors in the field well-funded?



HOW DO I KNOW I HAVE INTERESTS

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



CHECK OUT THEIR "PLAYGROUND"

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



SELECTING A RESEARCH PROBLEM

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



RICHARD HAMMING'S "YOU & YOUR RESEARCH"

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

- X [Youtube link](#) & [transcript](#)

2.

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

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



OVERSEAS VS KAIST

- X KAIST CS has internationally well known professors in most areas
- X 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
- X International experience still quite invaluable



IMPORTANCE OF ADVISOR

- X 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
- X Could also be your lifelong mentor
- X Usually good lab-mates come with good advisor
- X You could have access to your advisor's network

THE NINE TYPES OF PRINCIPAL INVESTIGATORS

Big Talker

These results have clear implications for the cure of cancer in our lifetime



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


Slave Driver

You know, 60hrs a week just isn't going to cut it in this lab



- (+) You get lots done
- (-) You forget your spouse's name

Demi God



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

Control Freak

Why didn't you use 25mM NaCl in the second wash?



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

Science Wonk

Why don't you try this new reverse gyropismatic amplifying DOR technique?



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

Laid-Back

Make it quick, I've got a 2:00 tee-time



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

Psycho

WHAT DO YOU MEAN YOU MADE A MISTAKE!?



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

Small Town Grocer



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

Rising Star

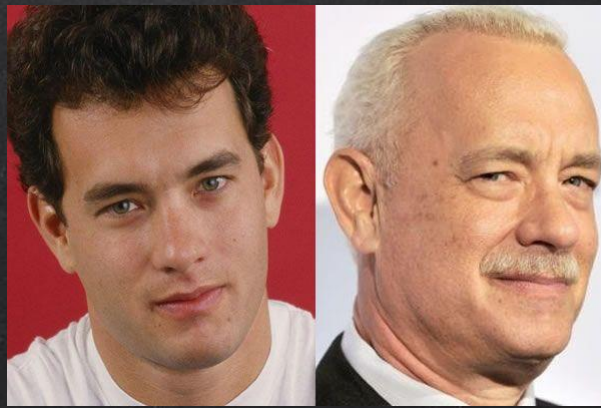


- (+) Exciting Ride
- (-) Not much room for you



CRITERIA FOR ADVISOR SELECTION

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



SENIOR VS YOUNG FACULTY

Senior

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

Young

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



BEN BARRES – HOW TO PICK A GRADUATE ADVISOR

- X Topic-wise, start broad
- X Pick an advisor who is a good researcher
- X Pick an advisor who is a good mentor
- X Are lab members happy?
- X “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

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



PICK AN ADVISOR WHO IS A GOOD MENTOR

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

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



THERE IS NO PERFECT ANSWER

- X Like all other important decisions in life, you won't have perfect information
- X You need to find what is "right" for *you*
- X Visit the school, department, lab, and advisor
- X The feeling must be mutual; s/he must also select you 😊
 - Always behave professionally
 - Professors share information just like students

- X 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

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

Read [this](#) and [this](#)



WE WILL HAVE A PANEL ON TODAY'S TOPIC

- X Date: March 25th
- X Post your questions on CampusWire