

Grad school, applications to academic positions, how to be successful in academia.

- Sources:

How to Be a Successful PhD Student (in Computer Science (in NLP/ML))

Mark Dredze (Johns Hopkins University)

Hanna M. Wallach (University of Massachusetts Amherst)

http://people.cs.umass.edu/~Wallach/how_to_be_a_successful_phd_student.pdf

The Nature of the Beast

Field guide to computer scientists

<http://www.cs.utexas.edu/~mooney/cs178H/slides/professors.ppt>

The 10-year process of obtaining a faculty position

https://www.cmu.edu/bio/teaching-club/resources/applying_to_faculty_positions.ppt

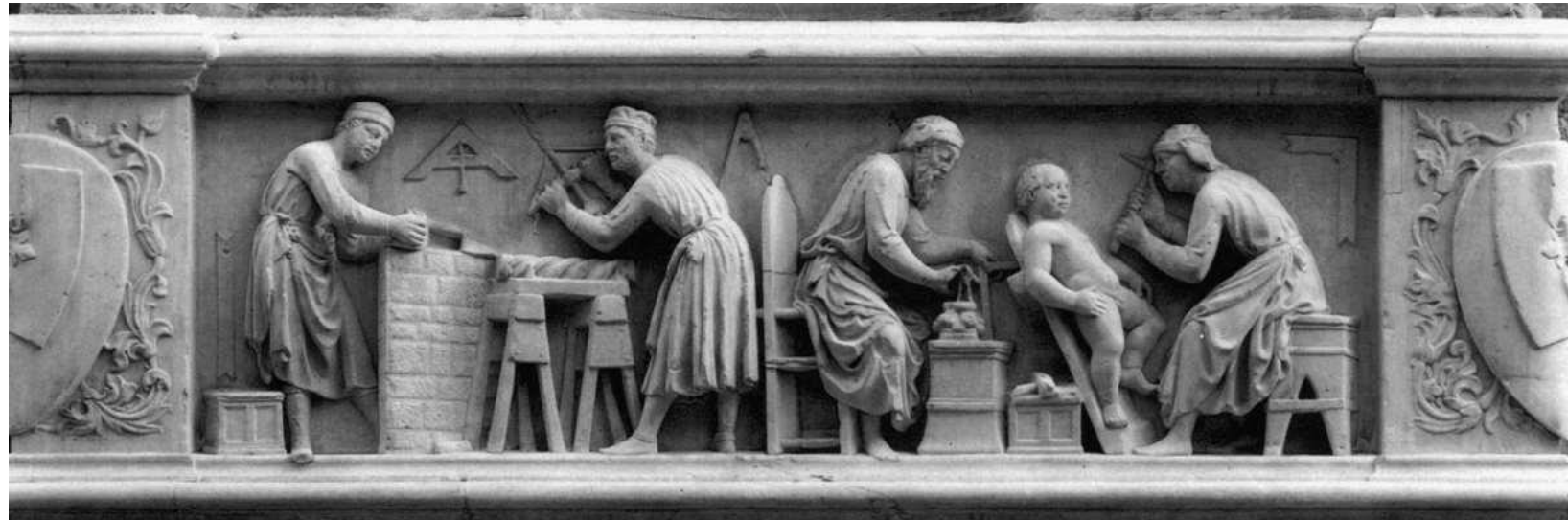
Advice to Young Faculty Members

Mark Wistey, Jan 2016

Graduate school:



Goal : learn from the “master” and ultimately become like the “master”
➔ Learn how to think, how to solve problems, how to put “stories” together...



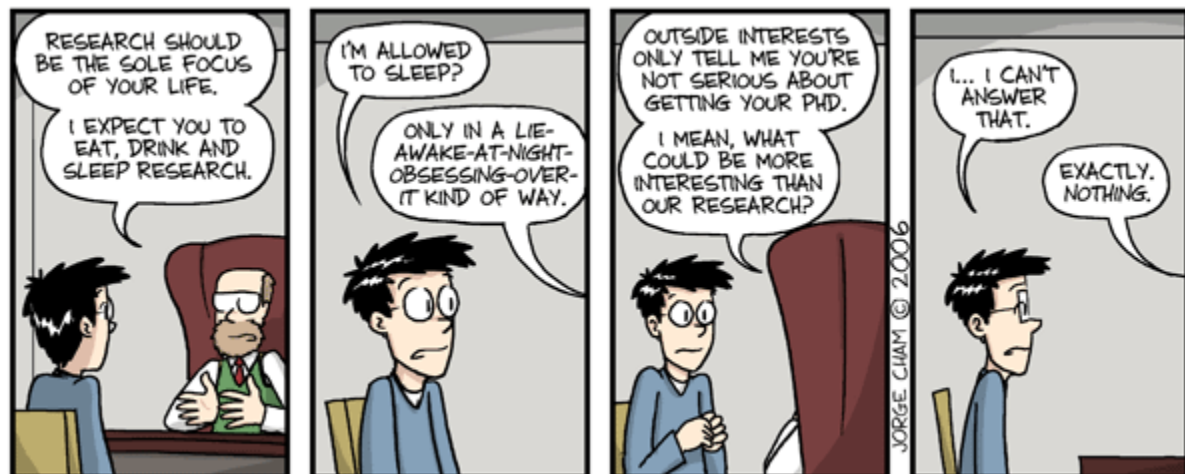
Research group...

Why Get a PhD?

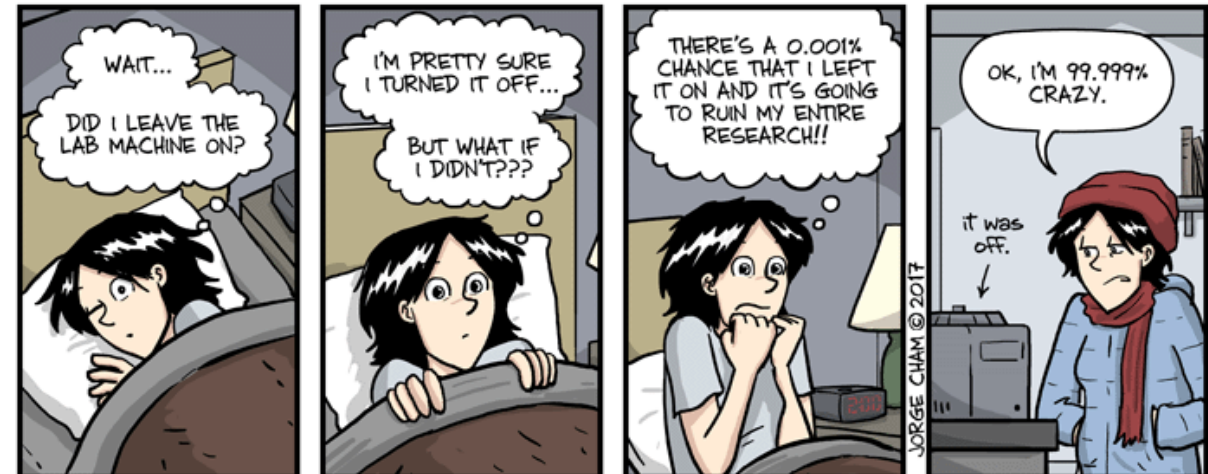
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2. **It's more than okay to do something else first.** Many students go straight from their undergraduate degree to graduate school. That's certainly fine -- in fact, that's what we did. However, some of the best PhD students left academia for a bit before starting graduate school. Doing something else gives you a break from the academic world and can help you gain perspective. Students who decide that they want a PhD enough to return to academia are often extremely motivated and do very well.

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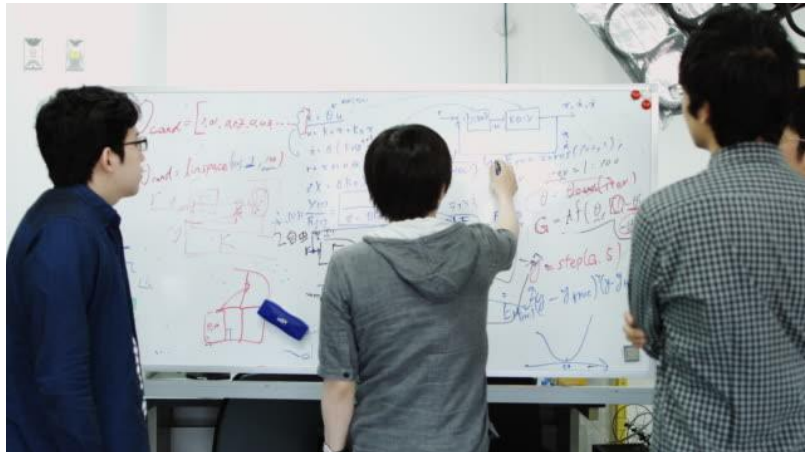
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Applying to Graduate School

3. **Think beyond the school.** Of course you want to go to the best school possible. But you also need to be happy. If you aren't happy, you won't be successful. If you find yourself with no social life and no friends, you won't be happy.
4. **Surround yourself with smart people.** Your advisor is important, but you will also spend huge amounts of time with other students. Being around smart people makes you smarter. If you are the smartest person in the room, it's time to find another room.

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You and Your Advisor

5. **Listen to your advisor.** They won't always be right, but they have been doing research for (in some cases much) longer than you have. (And, if it wasn't clear, your advisor is your boss -- you work for them. When your advisor tells you to do something, do it.)
6. **Ping your advisor.** If your adviser hasn't replied to an important email, remind them that you are waiting for their reply. (But first make sure that your email was clear. See here for advice: <http://matt.might.net/articles/how-to-email/>) Your advisor is (probably) a busy person and may not have seen your email or realized its importance.
7. **Feedback.** Make sure you obtain feedback from your advisor. This should happen at least once a year, probably in the form of a departmental student review. However, feedback is helpful and it doesn't hurt to ask for it more often, e.g., once a semester.

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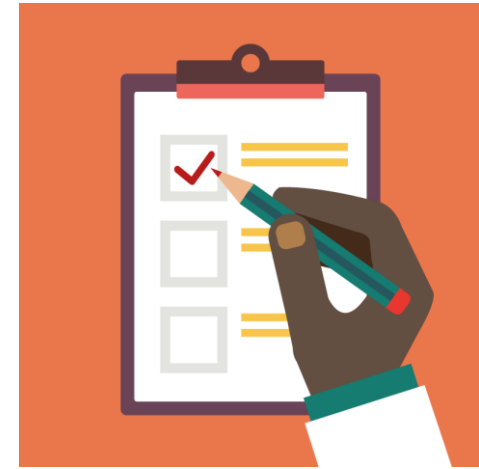
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Meetings with Your Advisor

This is your primary opportunity to get feedback, direction, advice, etc. Make the most of it.

8. **Meet regularly.** Regular meetings with your advisor ensure that you are being productive and enable your advisor to give you feedback. You should meet with your advisor regularly (e.g., weekly) -- ESPECIALLY if you don't want to.
9. **Make an agenda.** Make an agenda for every meeting with your advisor. Outline each of the topics that you'd like to cover during the meeting and their relative importance. If *you* don't know what you want to talk about, your advisor's unlikely to know either.
10. **Bring results.** Try to bring results (e.g., graphs, tables, figures) to every meeting.
11. **Start with a summary.** Start each meeting by summarizing the previous meeting. Remind them what you agreed on as next steps, summarize what you've done (and haven't done) since then, and go over your agenda. Your advisor has many research projects. Unlike you, they didn't spend the previous week working on your research project only, and will therefore need to context switch. Summarizing your previous meeting will enable them to switch faster and make sure you're both on the same page.

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Managing Your Day-to-Day Work Life / Being Productive

Graduate school is different from your other educational experiences and any job you've had. Success means being productive, creative, and independent. This doesn't come naturally to everyone, so figure out quickly how you can best succeed. Remember too that a successful person can fail. A lot. But you aren't judged by your failures, you are judged by your successes. You don't have to be the smartest person in the room, but you have to work very hard.

12. **Research is #1.** Not everyone is good at research: some people excel in the classroom, while others excel at independent research. However, a PhD is a research degree -- the purpose of graduate school is research, not taking classes. Although taking classes is part of graduate school, when it comes to success, it's all about research. Do well enough in your classes but focus on publishing high quality research papers.
13. **Talk to other students.** Talk to other students regularly, both within and outside your lab. This is a good way to learn whether your expectations of yourself and graduate school are realistic, as well as to learn about implementation details, interesting problems and solutions, ways of thinking and problem-solving, and "tricks of the trade".
14. **Everyone works differently.** Figure out how you like to work and what makes *you* most productive. (Do you work best in the early mornings or late evening? Do you like working with others or do you prefer to work by yourself? Do you work best when you have multiple projects or just one?) It's a good idea to discuss these preferences with your advisor so they understand you better and can work with you as effectively as possible.

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15. **Keep to a regular schedule.** This will help you make progress even when you're feeling unmotivated. It's generally a good idea to work in the lab at least 20 hours a week. You will benefit from having a focused work environment, being around colleagues, and being accessible if your advisor needs to find you. If you feel you can't work in the lab, try to figure out why, and do something about it (e.g., talk to your advisor).
16. **Prioritize.** You will find that you have many opportunities, and not enough time to pursue all of them. Try to figure out your priorities (e.g., research, classes, service, social life, etc.) and make sure you are spending your time accordingly. It's a good idea to do a time audit if you feel things aren't matching up. Learn to distinguish the immediate from important -- don't focus on immediate deadlines (e.g., homework) to the exclusion or detriment of longer-term, more important deadlines (e.g., conferences). Having a small number of high quality papers is better than many low quality papers.
17. **Make your own "next actions".** If you're sitting around waiting for your advisor to tell you what to do next, something is wrong. Find something to do, e.g., read papers.
18. **Keep a log.** Keep a daily log of everything you do and everything you think. It's a good idea to make sure your log is searchable (e.g., plain text or use a note taking program).

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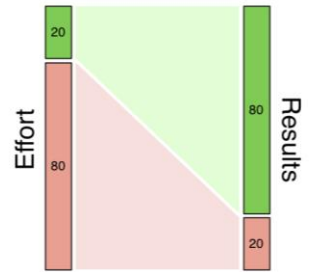
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The 80-20 Rule

"For many events, roughly 80% of the effects come from 20% of the causes." - Pareto



Therefore 20% of the effort produces 80% of the results but the last 20% of the results consumes 80% of the effort.

*But don't be a perfectionist...
... specially in your first 2-3 papers!*

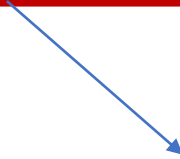
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21. **It's okay to get stuck.** Remember that EVERYONE gets stuck/demoralized/etc. No, really. Even super-famous, successful, seemingly-perfect researchers get stuck/demoralized/etc. What makes them successful, however, is that they figure out how to move past these low points to the next great idea.
22. **Learn from your mistakes.** Failing is fine (and arguably an important key to success). Failing will also happen often. The question is what you do *after* failing. Take notes. Understand why you failed and think about what you'd do differently next time. Many awesome research ideas came about because someone failed and then asked "why?"

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Also applies to publishing : you learn to write good papers by writing papers...
... your first papers will not be great and is OK!

Research

You are a PhD student and a PhD is a research degree. That means that your goal is to learn how to do high quality research. A PhD is like an apprenticeship -- you learn by watching others and doing yourself. For some, doing research comes naturally. For most, it's not something that just happens; it takes hard work and careful planning. There is a lot to learn about how to do good research, the major points of which we will outline here. In general, look to those around you, particularly your advisor, for models of productive and successful researchers.

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Reading Papers

You can't expect to jump in and contribute to an active field without knowing what other people have already done and are doing, what the main challenges are, and how people tend to think about these problems. All of this information comes from reading papers.

23. **Read, read, read!** Read multiple papers a week -- ask your advisor (or other graduate students) for suggestions if you're unsure of what to read. You have a lot to learn (especially in the first few years) and you'll primarily do this learning by reading.
24. **Take notes.** Make notes about every paper you read. Make notes at multiple levels of granularity (e.g., one sentence summary of the entire paper all the way down to sentence-level notes). Find a note taking system that makes sense for you.
25. **Read deeply.** When reading an important paper, try to understand where every equation comes from -- in other words, derive them yourself. If you get stuck, don't be afraid to ask someone else (e.g., another graduate student or your advisor) for help.
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Picking a Research Topic

You'll eventually need to come up with ideas for your own research. This is a process for which your advisor will be invaluable. We have some general advice on picking a research topic:

27. **Know the literature.** You need to know what's been previously in order to make sure your contributions are actually novel and useful. Know what's been done by others so you don't waste your (and your advisor's) time replicating well-studied ideas.
28. **Know the community.** Papers are not published in a vacuum, rather they are part of an ongoing dialogue within a community. Know that community, i.e., the participants, prior work, terminology, etc. You have to know who you are talking to and how to talk to them.
29. **Think big.** You shouldn't be trying to solve easily-solvable problems. Focus on solving big problems, even if you end up taking small steps towards a solution. There are many ideas that make for obvious papers that constitute simple extensions of previous work. While these papers may get published, they don't usually amount to much. Try to focus on big problems rather than making incremental improvements to previous work.
30. **It takes time.** Good research ideas don't happen along every day. It may take time for you to come up with a big idea, and that's perfectly fine. Ultimately, you will be judged on what you publish, not how long it took you to come up with the idea.
31. **Don't make up problems that don't exist.** Coming up with a new problem is great, but make sure it's *real* problem. If you can't think of at least three examples of your problem, then its probably not a real problem. Put differently, don't come up with hammers and then go looking for nails. Learn how to design/create hammers for actual nails.

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The Research Process

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33. **Start with writing.** When you have an idea, start by writing it down. Work out the details on paper first before you write any code. This will help expose problems and flesh out the details. This is especially helpful when working on mathematics. When working on a paper, write an outline before writing any text so you know what you are trying to do.
34. **Learn when to quit.** You can learn from failure, but only if you move on. If you find yourself repeatedly lowering your goals and expectations, you aren't making progress. Learn when to quit and rely on your advisor, who probably knows better than you do.
35. **Don't be deadline focused.** There is always another deadline around the corner. Publish interesting work when it's ready to be published. It's wonderful to use deadlines as motivation, but you shouldn't publish just because you received a CFP.
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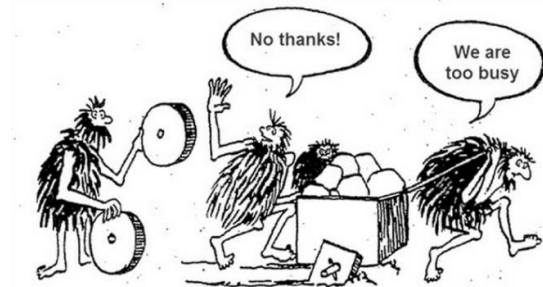
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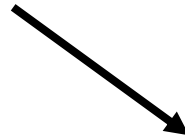
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The 10-year process of obtaining a faculty position

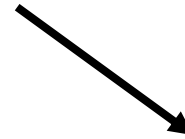
Graduate work (4-6 years)



Post-doctoral work (1-3 years)



a 2nd post-doc?



Faculty Position!

The Ecology of Academia

Two kinds of faculty

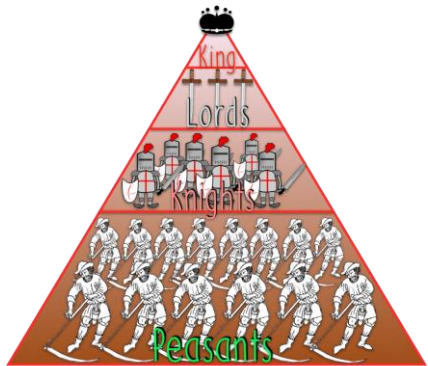
- Tenure track
 - Assistant Professor
 - Associate Professor
 - Full Professor
- Non-tenure track
 - Lecturers
 - Adjunct Professor
 - Visiting Professor

Research Professor

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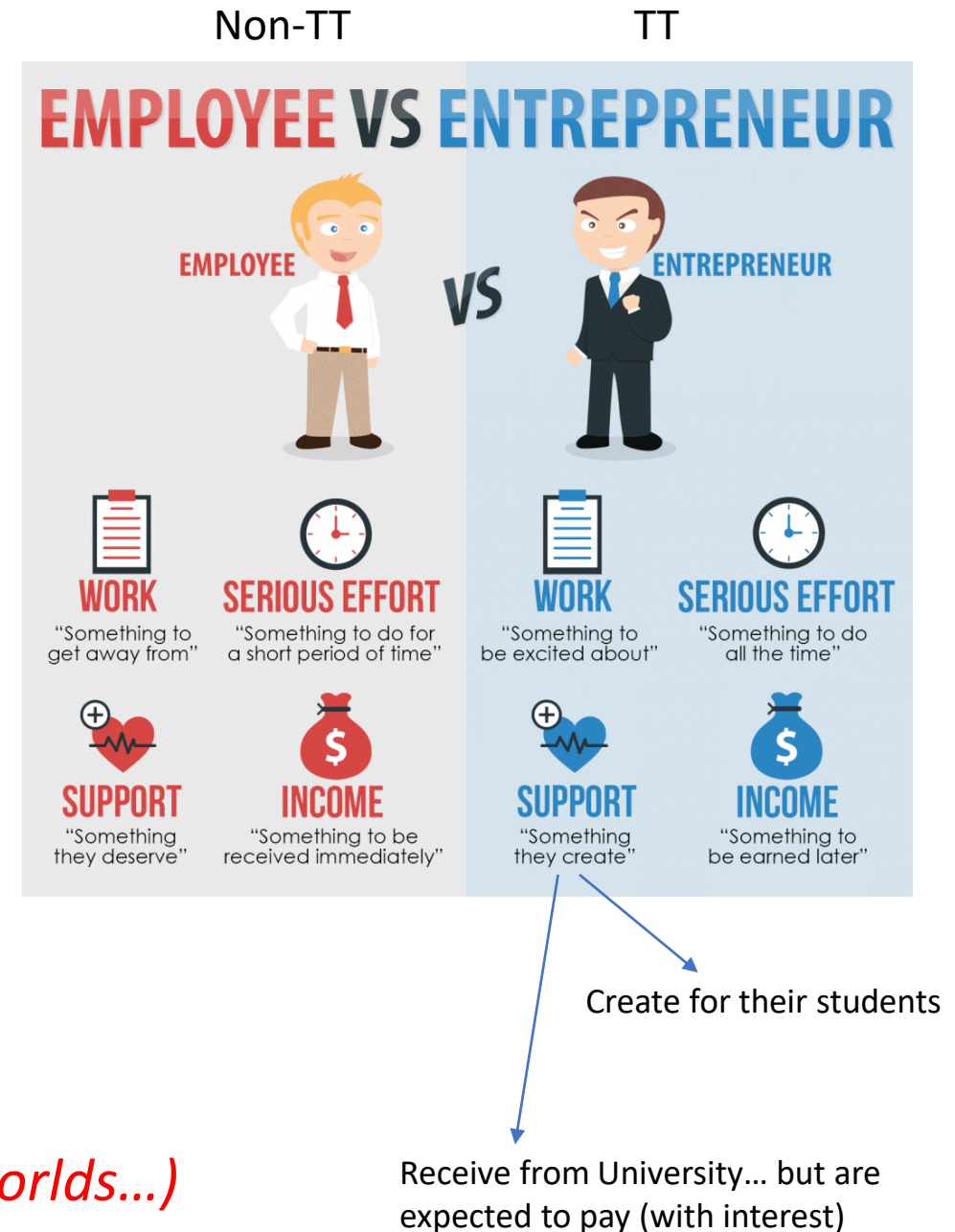


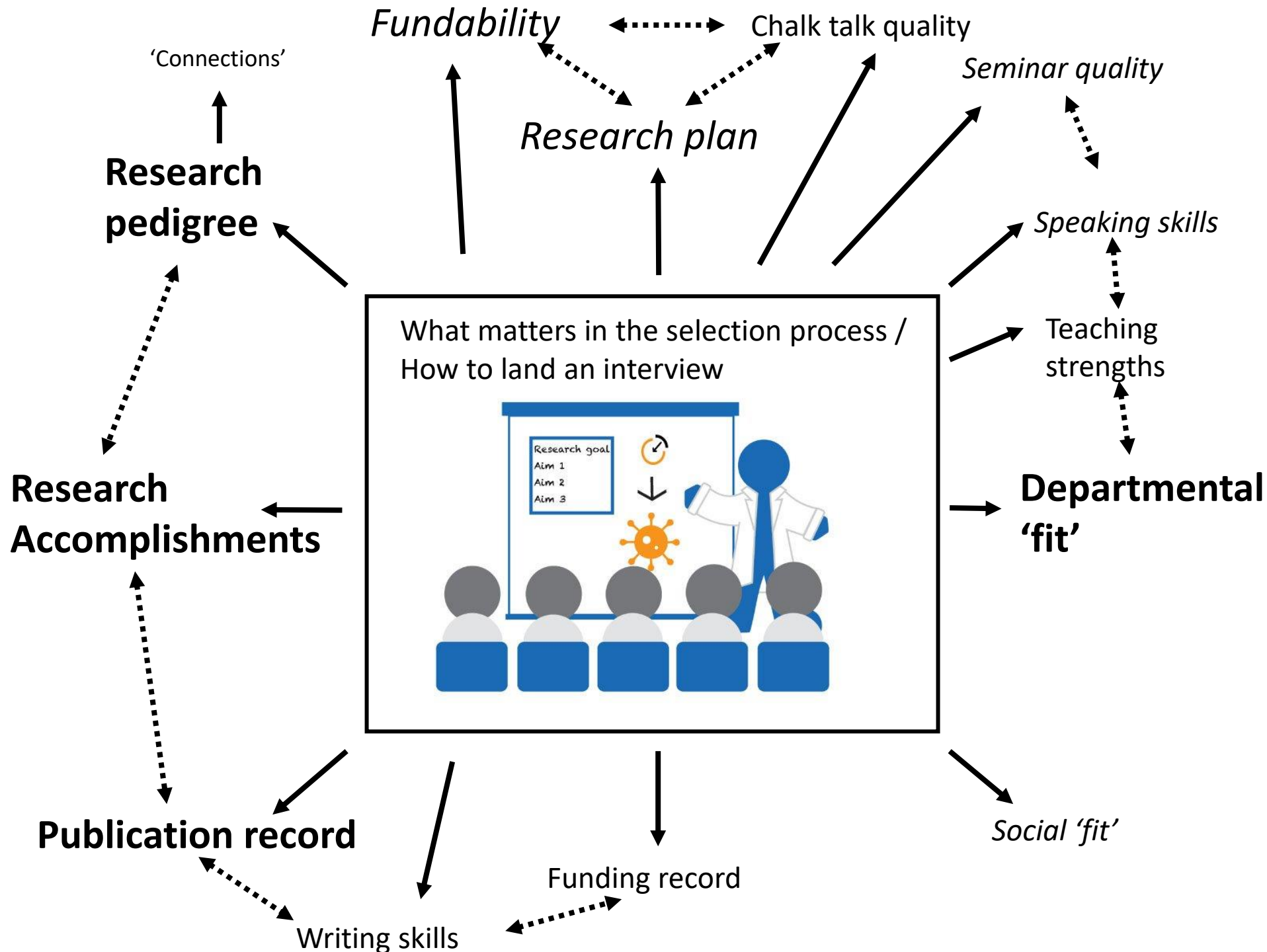
Academia is a feudal system...

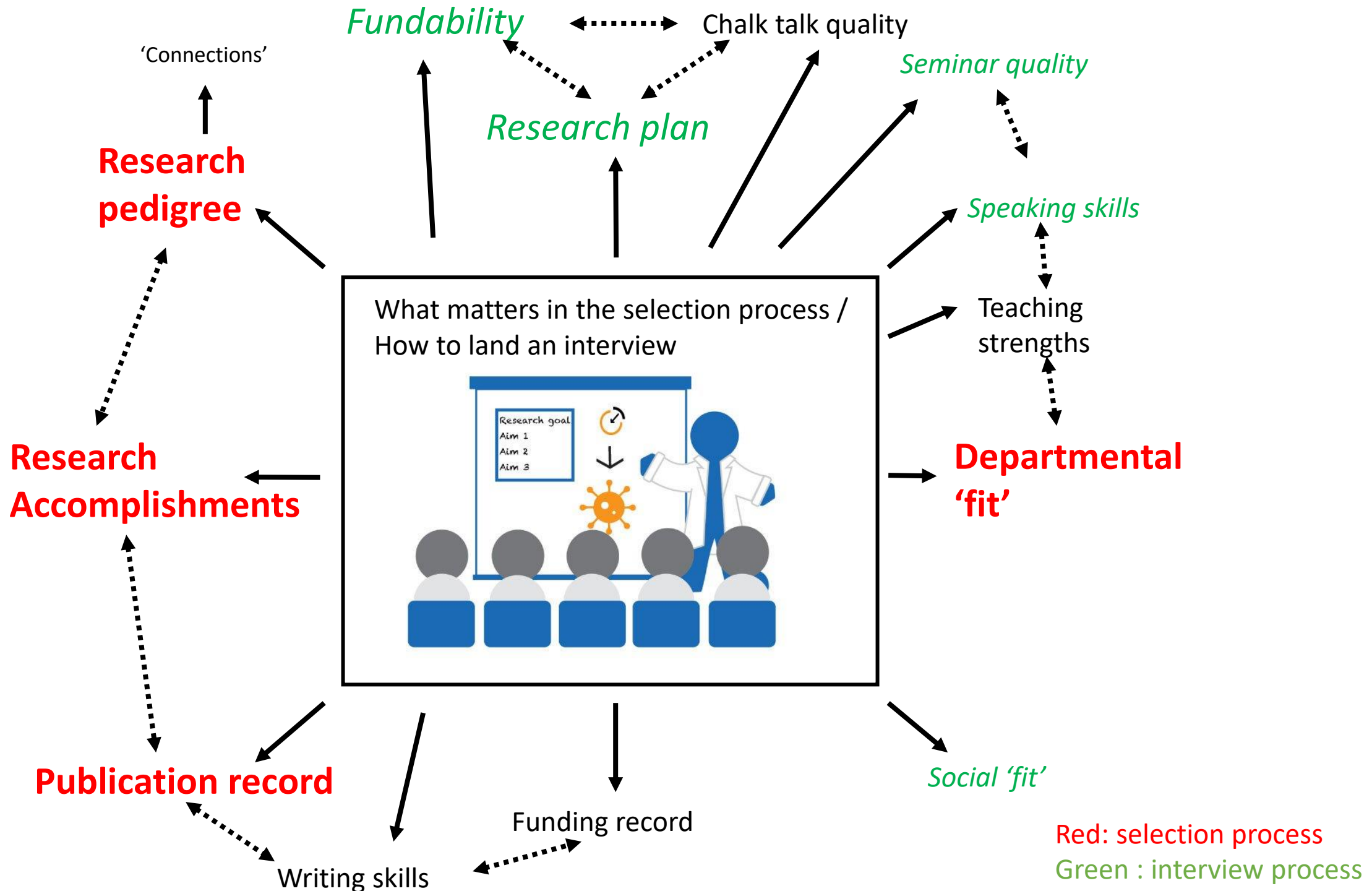
Research Professor (*worst of both worlds...*)



Not sustainable in the long run... unless you are a superstar in getting external funding... but if that is the case you better have a TT position!







YOUR CV

'Connections'

Research pedigree

Research Accomplishments

Publication record

Your publication/citation record must be exceptional.

RESEARCH ARTICLE NETWORK SCIENCES

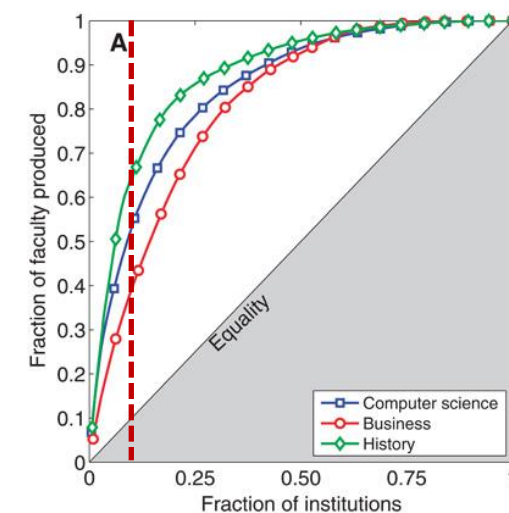
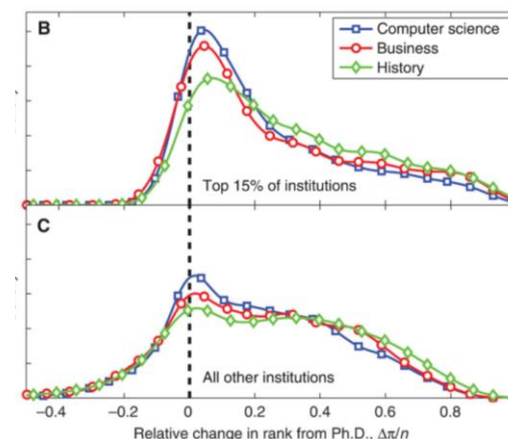
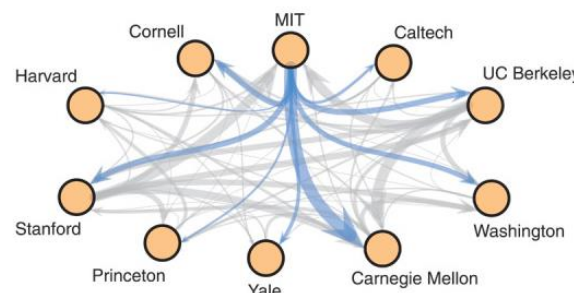
Systematic inequality and hierarchy in faculty hiring networks

Aaron Clauset^{1,2,3,*}, Samuel Arbesman⁴ and Daniel B. Larremore^{5,6}

* See all authors and affiliations

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DOI: 10.1126/sciadv.1400005

...doctoral prestige alone better predicts ultimate placement than a *U.S. News & World Report* rank, women generally place worse than men, and increased institutional prestige leads to increased faculty production, better faculty placement, and a more influential position within the discipline.



Across nation : most faculty across all universities tend to have gotten their PhD's from the top 10 schools.

Transitions are horizontal : you are likely to get a faculty position on an institution of similar rank to that of your PhD granting institution...

Systematic inequality and hierarchy in faculty hiring networks

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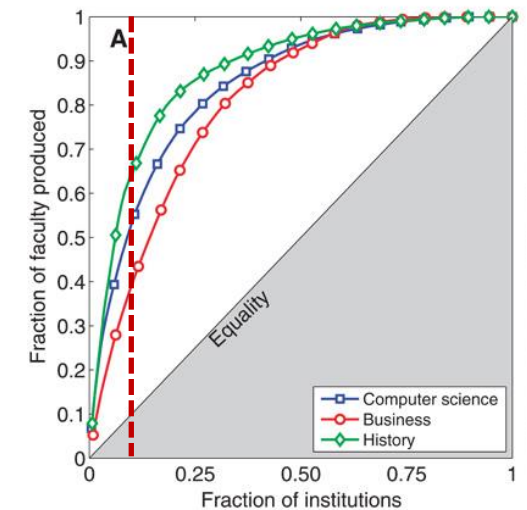
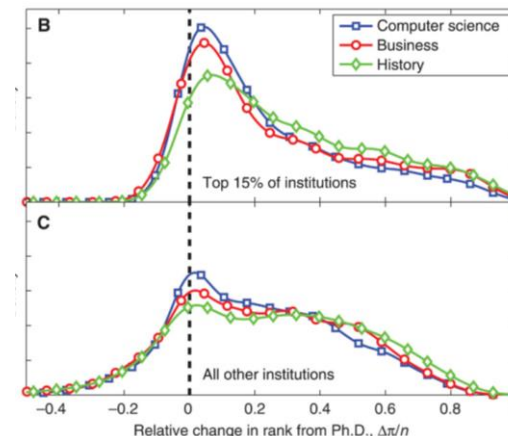
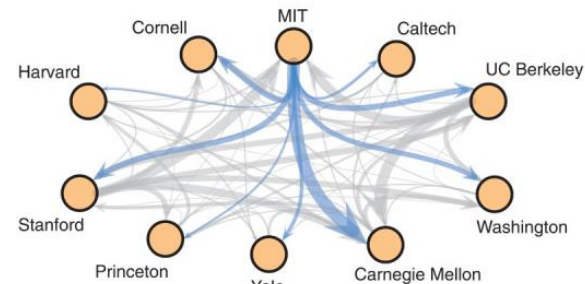
Coming directly from a PhD from the U, you might be able, with an exceptional publication record, to do an “horizontal transition” and get a faculty position in an institution of similar rank and similar prestige as the UofU: consider this when applying to faculty positions.

Try to network with people from those institutions, e.g. while at conferences.

Example institutions: University of New Mexico, Colorado State University, University of Arizona, Washington State University, UC Davis, Oregon State University,...

I strongly suggest, after graduating, doing a postdoc at a top institution (e.g. any of those listed in the right figure) so to enhance the “prestige” in your CV!

...doctoral prestige alone better predicts ultimate placement than a *U.S. News & World Report* rank, women generally place worse than men, and increased institutional prestige leads to increased faculty production, better faculty placement, and a more influential position within the discipline.



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SUMMARY:

Dr. Sensale-Rodriguez is a tenured Associate Professor at the University of Utah, with an appointment with the Department of Electrical & Computer Engineering. He joined the faculty at the University of Utah in 2013, after earning his Ph.D. in Electrical Engineering from the University of Notre Dame (UND). During his research career, he has received the National Science Foundation (NSF) CAREER Award, the Eli J. and Helen Shaheen Graduate School Award in Engineering at UND, the Best Student Paper Award at the 37th International Conference on Infrared, Millimeter and Terahertz Waves (IRMMW-THz), the best paper in Imaging Systems and Applications at the 2019 OSA Imaging and Applied Optics Congress, and the 2019 ECE department Outstanding Teaching award. Sensale-Rodriguez's research and teaching interests are in the broad areas of (a) applied electromagnetics and (b) electronic & optoelectronic devices and materials. With particular emphasis in the terahertz region of the spectrum. His research projects involve: (i) simulation and design of electronic and photonic devices, in particular employing emerging materials, (ii) fabrication and characterization of electronic & optical materials and devices, (iii) system integration of these devices.

He is the author or co-author of 58 journal articles, 71 conference proceeding papers, 6 book chapters, 100+ conference presentations, and delivered 30+ invited talks and seminars. His h-index is 22 with 3,000+ citations according to Google Scholar. He serves as a member of the editorial board for Scientific Reports (Nature Publishing Group) and Nano Communication Networks (Elsevier). He currently advises six graduate students and two postdocs, co-advises a few graduate students, and has mentored several undergraduate students. He is the faculty advisor for the student chapters of the Society of Hispanic Professional Engineers (SHPE) and the SPIE. Since joining the University of Utah, he has been involved in research efforts supported by about \$4.9M in external research funding, with Sensale-Rodriguez's share ~\$2.6M.

PROFESSIONAL PREPARATION

- 2009-2013 PhD in Electrical Engineering.
University of Notre Dame, USA.
Advisor: Prof. Huili Grace Xing; co-advised by Dr. Lei Liu.
Course GPA: 4.0/4.0.
Dissertation: "Novel Terahertz Devices Based on Tunable 2DEG Systems".
- 2003-2008 Electrical Engineering (Degree: Electrical Engineer)
Facultad de Ingeniería – Universidad de la República, Uruguay.
Course GPA: 10.03 in 12*
Project: "Development of an Autonomous Robotic Fish"
Advisor: Prof. Ing. Rafael Canetti.

Example, my CV

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My affiliation
(*this is the first thing
that people notices*)

Summary of positions +
Awards +
Research interests

Scoreboard
Number of papers, citations, \$

Where I studied, and who was
my advisor.

We will continue next week...

