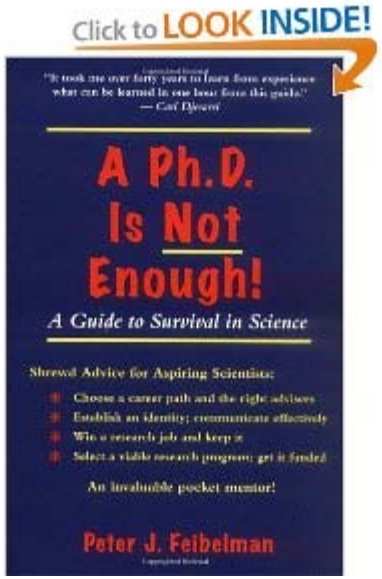
A Ph.D. is not enough

D. L. Feng

Academic achievement is no longer a passport to a successful career



王鸿飞的忠告

- Feibelman的书恐怕最终最大的用处是成为平庸的研究者在学术殿堂中的进身指南。**对于真正具有研究天赋的人，最好不要太看重这些东西**，研究做好了再学学，一点都不迟。我其实庆幸自己没有太早读到Feibelman的那本书，否则自己在做研究生时就不会无知者无畏地专 注于研究科学本身了。我的博士导师也从来不跟我讨论研究内容以外的问题，直到我快毕业之前才与我谈论一些学术界的事情。不要让小孩和年轻人太早地接触政治 和社会现实，否则会很容易妨碍他专注于知识和学问的发展，这是每个父母应当注意的。

Some skills related to a successful researcher?

- How to do research ?
- How to make a presentation ?
- How to write and fight? (Publish or Perish)
- How to sell yourselves (job hunt) ?
- How to sell your ideas (proposal) ?
- How to develop your image ?

Before we ask "how"

- Why do one choose science as a career?
  - Vision for the tomorrow of humanity
  - Believe that one can achieve more, though it is difficult
  - Curiosity --Just love it, for some people, the most romantic thing is to find what the nature truly is
  - Make a living
- Benefit of a science career.
  - Do what one loves to do
  - Rapture is the biggest reward ! If you haven't experienced, you haven't lived !
  - Science has no boundaries, many friends
  - Got to travel to lot's of different places in the world
  - Flexibility
  - It is not boring, especially when we are old
  - Life is not bad, especially in China

Find your direction

- Do what you love -- Find you passion
- Do what you are good at
- Do not be afraid to try
- Lot's of reading (sometimes 5 years of work is condensed into 4 pages, so read carefully)
- Lot's of seminars
- Lot's of thinking

- Diligence matters !
- Persistence matters ! (do not jump around if you are no genius)
- Vision matters ! (Choice of direction, mentor)
- Chance matters !
- Optimism matters a lot!

Become a professional

- Strict training on experimental habits
- Strict training on presentation skills and knowledge perimeter
- “Bad ass”, be tough on yourself and on work
- Make it professional, make it clean
- Be critical
- Perfectionist
- Face the bad part of our profession: Furious fighters, handle the pressure
- Be stylish

Develop your instinct

- First stage: standing on the shoulders of giants
  - It is the obligation of the teacher to bring the student to the frontier of research
  - Observe and Imitate the best scientist around you
- Second stage: Take a walk in the wild side on yourself
- Where does the ideas come from ? A prepared mind
- Wrong ideas vs. no idea → Surprise!
  - 跟着感觉走
  - 谋定后动 vs. 愣头青
- “Have you smell the blood?”
  - Become a killer, be a shark
  - If you stay on the front, you will be paranoid !

Build your taste

- Definition: the ability to know what is going to become important
- How to choose from many ideas? Know where and when to give up
- Do not work on your PhD thesis forever
- Vision or Luck?
  - Always prepare for the future (paranoid)
  - STM story

Experiment and data analysis

- Experimental preparation and planning (efficiency)
  - Know and respect your instrument ! （LDA the same, costly)
- During the experiment
  - Get excited, all geared up !
  - Real time data analysis and judgment making ability
- Data analysis
  - Dig a little deeper, although it may seem trivial to you at the first glance
  - “Royal to the raw data” is BS.
  - Data is not what you take, it is what you present

For graduate students

- The most productive years, the quickly transfer stage, use it, do not waste it
- C. Kim: I look back at the end of the 5 years of PhD, I find how stupid I was then.
- I found myself not smarter, just much more cautious, thinking more in a big picture
- I struggled for 3 years, and woke up one day finding everything makes a big picture.
- How mature you are emotionally and scientifically will determine your career success
- Be brave and open minded, if you lose interest in physics, move to other directions quickly, there are plenty of chances. (usually you will become richer, less stressful ☺)
- Do not forget to enjoy life !

How to make a public presentation

- Its importance can never be underestimated!
- Who is the audience, what is their interest
- Elements
  - Content
  - Media (PPT, movie, sound, ……)
  - Language, Flow
  - Charismatic (Charm, confidence, diplomatic, enthusiasm, polite but affirmative)
- Tricks
- Practice 10 times.

Slides

- Visibility
  - Your data is what's presented.
  - Plot the data to maximize the message
- Record your speech of each slide to make it concise and clear
- Prepare slides for questions
- Understand and be able to defend anything put on your slides, otherwise you will look bad, really bad!
- Printout, and work on transition
- Use note area
- Do not overdo ! (eg. too much flashes)

Tricks

- Does it tell a story? And smoothly?
- People are always happy to see what they can understand, spend ¼ time on these.
- Emphasis on your main points
- Take videotape of yourself
- Be critical to each other
- Eye-contact
- Humor is always welcome, ice-breaker
- Learn from other people
  - Chairman Mao, Clinton, Reagan
- Repeat
  - What I am going to tell you
  - Tell
  - What I just told you

Other presentation issues

- Short talk, long talk
- Public Relation (PR) talk
- Should they understand everything? --- Depending on the purpose of the talk
- Time control, split the talk into modules
- Question answer session
  - Most tricky place
  - Deal with nasty guys
  - Be diplomatic, do not be defensive

How to write

- It’s better to write a series of short papers than a long one. A long review later is fine.
- Avoiding attacking people, especially when you cannot really defend all your arguments. Make your paper free of political holes.
- Story making, Don’t write until you have a story outline, abstract, title etc.
  - Before hand vs. Afterwards
  - It’s a process of data re-analysis, more quantitative, deeper, broader
  - It’s a process of survey and reading
  - Make an outline with figure assignments
- Structure
  - Moving around your modules, to make the best story out of your data, do it in different ways
  - Each paragraph should convey one and only one message clearly, with a clear start and a clear end
  - Always mind the flow during writing, make it “nice and smooth”

- Introduction, motivation
  - Imitation is ok, but never copy !!
  - It's really the key to attract readers, especially if you want to publish in fancy journals
  - This is also the "so-what", "why we work on this" part in your introduction
  - If you raise an expectation in abstract or introduction, you have to address them thoroughly later, put yourself in the position of an outside reader, and see what expectation is not met.
  - Do not set up too a big "strawman" and shoot it, the motivation can be plain. Don't prove something old as if they are new
- Data presentation --- Strictness matters!
  - Convincing yourself vs. convincing others (情人眼里出西施, lover's eye is not the eyes of the referees unfortunately)
  - Anything you feel fishy, will eventually go get you
  - It's better you address them directly, than pointed out by the referee
  - No ambiguous "feelings" or arguments, needs direct prove, prove it or forget it, try to attack your arguments and see if you can defend it
  - Even you think it is trivial, better make it "fool-prove", there are a lot of strict-stupid guys out there.
  - However, don't be too specific and too detailed, it will waste space
  - If you try to use several long complicated sentences to explain a complicated idea, you may want to use sketch, table or other ways
  - If you get a number out, it better be very convincing and solid !

- Figures are the most important (for experimental paper at least)
  - Simple, clear, readable(big enough), try different ways to represent your data, pursue perfection here !
  - should follow the flow
  - Should help the flow
  - Should tell the story by itself
  - Make them nice, data is how you plotted
  - Use consistent labels
  - Caption can help with space
- Discussion
  - Read all the related theories, but do not try to link your data with just one theory
  - Follow what you said in the introduction part, do not start a complete new/irrelevant thing.
  - Don’t appear to be biased. If you like some ideas very much, but cannot convincingly prove it, detune your tone
  - Using proper summary figure or table to express your idea and drive the message home, and to put your finding in a bigger picture. For example, you can compare your numbers with other experiments, and your curves with some theory fitting, (compare, not prove)
  - “ No observation” usually does not mean much.
  - Don’t make your point weaker by saying others have done it
  - If something you do not understand, better speak out yourself, than by the referee
  - Discuss the implications of your results

- Discussion (cont'd)
  - Be fair to other people and diplomatic, don't make enemies.
  - If the interpretation is not unique, don't push it, list all the possible options will make you look professional
  - but if you can prove a big point, really then push hard
  - Don't be too self-protective, and no need to be humble either, be confident and cool (=not so emotional)

- Summary (the consequence, and influence)
  - Either no summary or a good one
  - Don't say "it's important" twice
  - Don't copy the abstract or the part in introduction
  - Can be neglected for space

- Citation
  - Don't put too much unpublished references
  - Don't put too much review articles, find the original
  - A good place to hide your criticism
  - Give other their credit, don't be stingy, but don't cite the non-major stuff too much
  - Cite both sides of the story
  - They will look for possible referees in your first 10 references

- A good paper is polished, not simply written
  - Be a perfectionist when polishing the paper
  - For your image in your advisor's mind
  - You should never rely on others, but always good to ask a colleague to read and check what is missing
  - Think critically on your own paper, if someone dose not understand your point, it is always your fault, something or some ways of expression in your paper is not the best
  - Polish 10 times, or 20 times
  - Check a, an, the
  - Check chinglish (also, then, and …, prep. in the beginning)
- Write fast
  - Without think about grammar, express your observation and explanation
  - Force yourself to write at least half an hour a day
- Work on the paper that you co-authored, give as much feedbacks as you can, you will learn and improve by practice this way!
  - Don't be selfish, lazy, incapable, give yourself a chance
- Never publish wrong results, it is a bad "CV" for you for ever !
- Never publish the same thing twice, even in conference proceedings !

How to fight

- Fighting with referees
  - This is part of our life, and our profession, don’t be angry, do it peacefully, it will make your arguments stronger
  - You do actually improve your paper
  - For referees who are neutral, make them happy
  - For bad ones, kick them out, look for evidence that he is prejudiced, polite and firm
  - Be a fierce fighter, but also know where to give up
  - Appeal
- Experience ☺
  - Learn from your advisor

How to be in contact with the “Circle”

- Talk with your peers
- A good family tree is important
- Be friendly and helpful
- Conferences
- On a solid base
  - Moral, Physical, and monetary support
- Good work is always very important
- Take responsibility, do service
- Learn to play some politics in a positive way

Nurture you connections

- Connections = chances
  - Samples, theoretical support, information, invited talks, sabbatical, good students, the future of your students … …
- Ideas come from interactions
- Collaboration is the key to many research areas
  - IXS story
  - “耐得住寂寞” – Don’t !!
- Teamwork, human skills
- Do not ass-kissing the senior, interact with your peers
  - “Einstein teaches the little girl” is a fairy tale
- Give the right respect and credit to others
  - Credit stories
  - Make your choices and take the consequences

For young scientists

- Professional image
  - **Brilliance, is that it?**
  - Curious
  - Respectful
  - Enthusiastic
  - Mature
  - Independent
  - Thoughtful
  - Diligent
  - Persevering
  - Flexible
  - Confident

- Don't focus on demonstrating your own brilliance. Focus instead on expressing genuine interest in your mentor's brilliance!

- Often, it is less intimidating to think about asking a question that expresses your curiosity than answering a question to illustrate your extensive knowledge. In fact, showboating your intelligence may backfire when you try to impress would-be mentors. Sometimes, by trying to strut your stuff, you wind up looking insecure, obnoxious or conceited. Not exactly the impression you want to convey!

- How do you ask good questions that will show your mentor that you are intelligent? Ask smart questions about her work. Read the recent work of your advisor, your departmental colleagues and other academics you'd like to have as mentors. Read and think about their work. What questions does it raise? How does it relate to your work?

- Take the time to learn about the people you work with or want to work with. Informing yourself about their scholarly efforts is a respectful and mature way to foster the relationship.

- Pay conscious attention to how you want to be perceived, and cultivate specific qualities. This does not mean that you should "fake it." Most people don't like apple-polishing, insincere flattery. People who "suck up" are disliked for a reason. And when fake adoration does fool someone, it is usually someone with insufficient social skills to notice false pretenses. Who wants an academic with poor social skills as a main mentor, anyway?
- Are you a curious person?
- Are you respectful, or mature, or diligent, or enthusiastic?
- You are not faking it. You are thoughtfully helping people get to know your best self.
- Remember that a sense of humor goes a long way

As an advisor

- “I cannot do better than my students”
- “胡萝卜加大棒”vs.“鼓励和交流”
- Create a learning atmosphere
- Create a harmonic team
- Group/team work, cooperative, not competitive environment
- The goal of physics education is to create independent thinkers
  - There is no end with “teaching students”, rather train them to learn and teach the professor
- Yes, politics matters !
  - 中国式成功=能力+团队+舞台
  - funding

What leads to success ? – You tell me!

- Design your own career path, find what you like
- The best is of course: Do what you are good at, and love what you do
- Persistency and be optimistic (Xue's way)
- A good attitude to life and work
- What is the most important to you?
- How would you be remembered? Ask So what?
- Vision and mission
- Observe! Learn from other people's success and failure.
- Work hard!
- Do the right thing at the right time! Good luck, do not miss your opportunity.

Thank you!

Only the paranoid survives !

殘酷的競爭和淘汰，適者生存 !

If you can do physics, you can do anything !