Fisher Files, Sequence II
Text summary

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Introduction

> In a single day, we perform over two hundred small tasks: dial a phone, sharpen a pencil, open the computer, begin to type a paragraph. How do we connect all those small task to the larger aims of our lives? Are we even aware of what the larger aims of our lives are?
>
> I have thought more and more about making and maintaining the connections between the large and small. Sometimes, these connections just fall apart for me and I find myself doing useless and irrelevant things. Other times, some connections are there and strong and I have an almost spiritual sense of mindfulness. The way the connections help me translate large aims to small tasks is not so much about productivity as they are about relevance.
>
> My ten episode podcast talks about these connections between the large and small and how to make time to think about them, create them and maintain them. I don't have many answers but I do have lots of questions and pointers to others exploring the large-small connection. I plan to emphasize the practical and talk about ways of handling things like e-mail, interruptions, travel, and the balance between work and family, always with an eye toward the strengthening the large-small connections. Cool technologies will be emphasized.
>
> I'm aiming at physicists, specifically those just starting the most challenging part of the career: senior graduate students and junior post docs, but there will be plenty for everyone in academia. "The Fisher Files" will post on Sunday nights and will be twenty to thirty minutes long. In addition to the main topic, there will be a five minute MindFeed about what is going on in physics last week. Listener comments by voice, e-mail, or direct post to the website is more than welcome.
>
> - Peter Fisher, from the About section of the Fisher Files website [1]

Episode 1 - Imposter!

- It's OK to feel like an imposter. A little humility is a good thing.
- But you have to recognize your own self-worth.
- Some advice on how to avoid the trap of getting too down on yourself:
  - It is easy to make the mistake of lumping a bunch of individual achievements into one. If you take the `AND` of all the achievements of everyone you know, of course you will lose out since `person1 AND person2 AND ... AND personN` $\gg$ `you`.

- You should realize that other people see you very differently than you see yourself. They remember the great successes that you had in the past and **continue** to recognize them despite the fact that your life may not be going very well this particular day, week, or year. Good work is not forgotten! To get some perspective, think of how you view others.
- In academia (unlike many careers), you are often only one brilliant idea away from greatness. If you do something great as a grad student, your work will (usually) not be diminished by your status as a grad student.
- Have confidence in what you know. Stop and reflect about all the things you know and can do. Think of all the major milestones you've passed: qualifying exams, getting your undergraduate degree, etc. Those are all significant accomplishments.

Episode 2 - Screwed!

- Stick up for yourself when confronted with a conflict. Don't get walked all over. If you don't deal with the conflict, it becomes emotional baggage later. Not good.
- One way to resolve a conflict is to talk to the perpetrator. But be careful. First, meet at neutral ground (e.g. tell the person, "let's get coffee"). Find some way to approach the issue indirectly, rather than attacking the person or forcing the issue. If the person feels relaxed and not-defensive, you are more likely to get his/her real perspective. Keep the conversation from degenerating into a battle. It only gets ugly from there.
- A good thing to do before you confront the person or the issue is to seek the advice of senior people. They have experience with such matters and take the long-term view.

Episode 3 - Your thesis

- For the student, the thesis is their first real attempt at scientific expression.
  - A time when you stop and summarize what you've done in last few years.
  - A watershed moment in your career.
  - Your thesis should be well-written, well-formatted, well-thought out, and represent a good piece of work.
  - Your thesis might not be read much, but that's not the point; the point is the process.
  - The thesis is an exercise in bringing something to completion in a graceful and elegant manner.
- Start writing the thesis about 9 months before defense.
  - Typically, the work is still in progress at this point.
  - The intensive stage of writing comes 3-5 months before the defense.
  - Should have data analysis done before intensive phase of writing.
  - Advisors and students should decide consciously when the thesis officially starts.
- Length of the thesis
  - Length of thesis is debatable; Sam Ting wants 25 pages, Peter starts with a low figure of 40 pages, but his students theses typically end up being 70-80 pages.
  - The thesis should not be a bloated work that includes everything.
  - It should be concise and readable with an emphasis on what **you** did.

- Steps to planning the thesis
  1. Write an outline down to level 2. Level 1 is the chapters, level 2 is the sections of the chapters. If the student writes a good level 2 outline, Peter usually finds that half the battle is won.
  2. Figure out how many pages each section will be (typically 15-25 parts which are a few pages long).
  3. Make up a writing schedule. It typically encompasses 7 months which may seem long, but that's how long it takes.
- Writing the thesis
  - Read Strunk and White [2] to get a sense of what good writing is; you want to write a good thesis so that you end up with something that you are proud of.
  - Peter's philosophy: the student should minimize explanations or descriptions of work they weren't involved in.
  - Example: description of L3 detectors. Student would describe each major component, give major numbers describing their performance, give rough dimensions of the components, and provide good references.
  - Technical details like construction of hardware should go in the appendix and not the main body.
  - The thesis should be a story that explains the motivation, design, and execution of the work. However, it should not rely on narrative.
- In physics, professors won't let their student defend their thesis if the content of the thesis is wrong.
- Peter: I won't schedule the thesis defense until he and the student have agreed that the thesis is in its final form, meaning that they know what the result is although the writing of the thesis itself may not be finished.
- Advisor's role in the thesis
  - Key point: there needs to be good communication between the student and advisor early on, otherwise a lot of time can be wasted.
  - Advisor should guide and not write the thesis, especially in matters of style, how the thesis is worded, and logic.
  - Advisor should allow the student to express things in their own way.
  - However, the advisor and student obviously have to agree on the conclusion.
- How to mitigate the onerous task of writing the thesis
  - Set intermediate goals (weekly if possible).
  - Give yourself a little treat after you accomplish each goal (e.g. a nice dinner).
  - Ask fellow graduate students and postdocs to look at your drafts as you go along.
  - Postdocs can be extremely helpful because they recently wrote their thesis and they haven't been jaded by reading dozens of theses like faculty.
- Senior theses
  - Typically shorter than PhD theses.
  - Not necessarily a scientific statement, can simply be a description of what the student has done.
  - Peter: I will often have students write about instrumentation or a calculation they have done.
  - Student should finish their research by September of the senior year, spend fall term writing the thesis, and turn in their thesis during spring semester.

  - This gives the student time to enjoy spring semester of their senior year and avoids the crunch of writing just before graduation.

- Summary
  - Plan your thesis well ahead of time.
  - Take it slow, which allows people to make reasonable decisions.
  - Talk to lots of people.
  - Communicate well with your advisor.
  - Remember the goal of writing the thesis is to have a product that you're proud of.
  - Remember that the goal of graduate school is to show that you can take command of something.
  - Often, while in the process of writing the thesis, the student will become enthusiastic about his/her research topic and realize that he/she can be an expert in a difficult topic that few people understand. This can be quite charming from a faculty standpoint.

Episode 4 - Postdoc

Getting a Postdoc

- Preliminaries
  - A good time to start looking for a postdoc is when you begin to write your thesis.
  - Think about what you want to do with your life.
  - Decide whether you want to stay in academia or do something else.
  - Talk to your advisor and people a little outside your field to learn about jobs outside academia.
  - Myth 1: You can get a job as a quantitative analyst on Wall Street. Yes, but quants are not a part of the company's core operation so they can easily be laid off in an economic downturn.
  - Myth 2: Industry pays more. Yes, you get more in dollars, but you have to look at other costs. Academia allows flexible time whereas most jobs require you to be in the office 9-5. There is also a dress code in business. Finally, academics don't have the expense of beautifying their homes for the purposes of entertaining guests for business.

- Where to look for a job
  - Look at the web and back pages of *Physics Today*.
  - Use the web/print to get a sense for the market and what people are looking for. This is also useful if you want to change your field a little bit.
  - Talk to your advisor and other people in your group.

- Contacting people for jobs
  - Component 1: CV
    * The CV includes educational history, positions held, references, contact information, etc.
    * Put everything in there. Don't leave anything out or assume that people will look up that information on the web.
    * The primary purpose of the CV is to provide factual information. Intangible information should be in the cover letter.
  - Component 2: Cover letter

    - Write separate cover letter for each job.
    - Paragraph 1: Tell person a little about yourself.
    - Paragraph 2: Say how you heard about the job and why you're interested.
    - Paragraph 3: Conclude with saying that you'd like to apply for a position and come visit. Be sure to give your contact information.
    - You want everything to fit on one page because the reader doesn't have time and because at this point, you don't have a lot to say anyways.
  - Act quickly if someone tells you they have a job opening. Email them your CV and cover letter immediately.
  - It is generally easy to find good postdocs because there is a strong demand.

- Job talk
  - This may be the first time you have given an hour long seminar.
  - What you talk about should be interesting and engaging even if you personally think it's boring. That's just your perception.
  - You will probably have a mixed audience ranging from undergraduates to senior faculty, so you should have something for everyone
  - Don't feel compelled to show every detail of everything you've done.
  - Your talk should achieve these two key things: a) be interesting and engaging and b) make it clear what your role in the work was.
  - Outline of the talk: a) why audience should care about the topic, b) why you care about the topic, c) what you've been doing.
  - Mention the technical skills you've developed.
  - Unlike most talks, the job talk is really about you. The job talk is different from a conference talk where you are speaking on behalf of your collaborators.

- Interview
  - You should feel free to ask any questions you feel are important.
  - Talk to people at the institution at all levels: faculty, postdocs, graduate students.
  - Arrange time to meet with postdocs and graduate students because their lives will become your life.
  - Before you leave, make sure you and your host have a clear status, i.e. who will be contacting who and when about an offer.
  - After your visit, send a thank you note.
  - If you're not very interested, say so and it will make it easier for you to say no later.
  - If you're really interested, absolutely say so
  - If you would absolutely take the job, say so but be a little circumspect.

- Accepting an offer
  - If you get an offer, you have one week to one month to give an answer.
  - There is a little room for negotiation on moving costs.
  - When you get ready to accept an offer, email the person with your understanding of the position including start date (should be compatible with thesis completion date), your expected responsibilities, etc.
  - Make explicit what your expectations are before you take the job.

Being a postdoc

- Purpose
  - Graduate school is about demonstrating that you can complete a piece of work, have mastery over some area of your field, and that you have some technical skills you can build on.
  - Postdoc is about demonstrating that you can undertake a major element of your group's program and bring it to fruition.
  - This will involve managing students (possibly other postdocs), managing resources, and representing work within your community.
  - This also includes showing that you can operate autonomously.
  - Make sure you accept a job where you can do all these things.
  - When you start the job, spend a month listening and seeing how things work in your group and field before you make a move.
- Credit
  - You should carve out your own part in a project, but at the same time, you need to collaborate and help other people.
  - There may be conflicts, particularly if you take a job with a junior faculty member.
  - Working with junior faculty is not necessarily bad since they often have the most interesting and exciting ideas.
  - However, they are in the same position as you: to be promoted, they need to be seen as people who did a certain piece of work.
  - This can lead to fighting over credit.
  - Avoid these types of conflicts by discussing the matter well beforehand
  - Peter: in his experience, there is more than enough credit to go around and the specific details of who did what don't usually come up in tenure review. It's more about was guidance given, was there support/synergy, was there a nice mix of abilities.
- Broad perspective
  - The postdoc is a good time in your career because you have little responsibility (no teaching or committee work) and you can really focus on your research.
  - It is also a good time to switch out of physics as a career.
  - Be aware that your postdoc has a limited time extent, so you should make sure your project comes to fruition before your postdoc ends.

Summary

- Start looking for a postdoc well in advance.
- Think about it a lot.
- Talk to lots of people.
- Pick something you're interested in and passionate about rather than something safe or easy.
- The postdoc is a time you need to excel and you are more likely to excel in something you believe in.

Episode 5 - Travel

- Three questions to ask before you travel:
  1. Why are you going?
  2. Do you need to go? (Be honest with yourself.)
  3. What is the cost?
- The cost and why travel sucks
  - Count on spending $200 per day in addition to plane tickets. Hotel stay costs $120 per day, and food/transportation costs $80 per day.
  - Count on losing half a day before and after the trip.
  - You will need to reschedule things (e.g. appointments) that you would normally do when you are gone on the trip.
  - Airports and airplanes are physically bad for you (bad food, crowded, noisy, bacteria).
  - The uncertainty about when you will get somewhere and the waiting time is stressful.
- Ways to make travel better
  - Take a direct flight, minimize time on airplanes.
  - Carry-on your luggage and don't check in any luggage if possible.
  - Don't forget chargers and adapters for electronic equipment.
  - Rent a car; it's much more flexible and reliable than a taxi or public transportation.
  - Pay extra $20 for GPS unit if you're in unfamiliar territory.
  - Method to fall asleep: count breaths (1 - exhale, 2 - inhale, 3 - exhale, . . . , 10 - inhale, repeat).
  - When you get to the hotel, immediately unpack and make yourself at home (hang things up, tidy up).
  - Eat well and sleep well (otherwise you are at high risk for getting sick). Peter likes to carry apples and water.
  - Go to the grocery store and pick up some simple food so you can eat what you like, when you like, and in non-public places.
  - Treat yourself a little; don't be a miser.
- Don't travel at all if you're just exchanging information, use technology like Skype, IM, video conferencing.
- Miscellaneous
  - Don't tell your spouse/friend/etc how horrible your trip is going to be and how you don't want to go. Tell him/her how important and valuable the trip will be to you.
  - Getting tons of work done on the plane (because of no distractions) is a myth.
  - Reality is probably: 1/3 time, get work done, 1/3 time, reading or other pleasant task, 1/3 time, just lost time.
- Organization
  - Keep receipts in a zip lock bag while you are traveling.
  - Unpack immediately when you get home and take care of travel reimbursements.
  - Send thank you notes to people afterward.

Episode 6 - Junior faculty positions

- Getting a junior faculty position is much different from getting a postdoctoral position. Unlike a postdoc, there is:
  - Clear evaluation of your work
  - Deep emotional commitment on both sides
  - Heavy investment in personal relationships with colleagues
  - Broader commitment to the university and responsibilities besides research
  - Involvement in running the university
  - Expectations that you will work with colleagues to solve problems
- How to get a job
  - You need a strong publication record. You will be evaluated on your scientific achievements and their importance.
  - Make sure you get an important result as a postdoc.
  - Make clear what role you had in the result.
  - Emphasize leadership abilities: supervision of students, working with multiple colleagues.
  - Develop a strong research direction that matches the department's interests.
  - Commit yourself to a research direction. Don't appear to be "flexible" and desperate for any old job.
- Timing
  - Time your research so that you get results before the fall.
  - The search committee gets together in the fall and puts out ads.
  - Shortlist comes out in November-December.
  - Interviews occur in December-February.
  - Decision is made in January-February.
  - Offers are made in the spring.
  - Talk to senior people to find out where are the open positions and the quality of the institutions.
- Components of application
  - CV
  - Publication list
  - Three letters of recommendation
    - Don't just email the recommenders. Write a formal letter.
    - The most important quality in a recommender is that they can talk about you and your work.
    - It's good to ask senior people to recommend you, but only if they know you well.
    - Make sure you don't ask someone who just writes uniformly effusive (but useless) letters.
  - Cover letter
    - Two ways of doing the cover letter: a) short cover letter attached to research statement or b) long cover letter including research interests
    - Peter recommends the long cover letter, tailored to each university so that it seems like you're interested and not just looking for a job.

  - Get started early, well ahead of the deadline.

- Letter of recommendation
  - A good letter does not need to be long, the more concise the better.
  - Introductory paragraph on how the recommender knows the candidate
  - A few paragraphs on what the candidate has done
  - A few paragraphs assessing the suitability and characteristics of the candidate
  - The letter needs to be useful to the committee!!
  - If you can, meet with the recommender and explain where you are applying and how many letters are needed.
  - It is useful to give the recommender a one page summary of your accomplishments.
  - Ask for letters early.

- On-site visit
  - When you apply for a postdoc, you are mainly trying to convince the advisor that you are competent.
  - When you apply for a faculty position, you have to convince the search committee that you know what you're doing **and** that you know where you're going.
  - For a job talk, stay on time and allow time for questions. Make your job talk interesting. Find out ahead of time who your audience is
  - Expect to talk to at least 8 people during your visit, give your talk, and go out to dinner over the course of one to two days.
  - Have answers prepared for:
    * Why do you want to come here?
    * Where else are you looking?
    * Why do you think your research interests fit with the department's research interests?
    * How do you anticipate dividing your time between the university and the laboratory?
    * What level of startup funds do you need?
  - Do not be passive in the interview. Find out what the place is like and what you are expected to do there.
  - Questions for you to ask
    * What is the hiring process?
    * When will the decision be made?
    * What is the nature of the position?
    * How likely can a hire be made in this area?
    * What is the tenure process?
  - Be sure to ask people about their research and take an interest in them.

- Job offer
  - Tell them how much startup funds you need.
  - Ask for help with relocation expenses.
  - Find out what the teaching load is and how many terms you get off.
  - Find out how many advisees you are expected to have.

  - See if you can negotiate for a lighter teaching load.
  - Use all of the above to gauge how serious they are about the offer and what the institutional environment is like.
  - Talk to peers about where they are going and find out the "going rate."
  - Find out how many junior faculty are ahead of you and determine if the institution will/can nominate you for a Sloan fellowship.
  - Don't let the negotiation drag on too long. Two to three iterations should be enough.

- Starting the job
  - Don't take on too much: you will be busy moving and possibly changing research direction.
  - This is not the time to get involved in writing a major review article or some wacky, high-risk project.
  - Get a list of the incoming students and write each a personal letter telling them who you are, what your research is, and inviting them to visit you.
  - Getting one or two good graduate students is key to success.
  - Accept social invitations from other faculty if possible.
  - Get invested in your community.
  - Give seminar/colloquia early on to "introduce" yourself to the community.

Episode 7 - Giving a talk about your work

- Why are you giving this talk?
  - Affects how you prepare
  - Affects what visuals you use
- What messages are you trying to convey?
  - Is it a job talk, conference talk, colloquium, or popular talk?
- Don't automatically just give any talk that any old person asks you to do. Like travel, there is a major time commitment.
- General advice about talks
  - Most important tips
    * The talk needs to be interesting!!!
    * The talk needs to be informative.
    * You should have a conscious idea of what your message is.
    * If you don't have a conscious idea of what your message is, you don't have a clear idea of what will come out of your talk.
  - Logistics
    * Don't go over time or rush at the end.
    * Target a 50 minute talk for a one hour time slot.
    * If you have a movie, make sure it works on the actual projector. The lighting could be bad, or the projector might not be compatible with the movie.
    * Bring a hard copy of the talk.

    - Setup your computer a minimum of 15 minutes before the talk.
    - Don't use transparencies that were obviously written on the plane. That insults the audience.
    - Have a PDF of your PowerPoint/Keynote presentation as a backup.
  - Message/scope
    - The number of big ideas should match the amount of time you have.
  - Structure of the talk
    - Find a way to make your talk interesting.
    - Make sure you talk about things **you** are interested in.
    - Don't just give a cookie cutter talk.
    - Audiences can tell if you are truly interested in your talk.
  - Style of talk
    - Use more pictures/graphs and less diagrams, bullet points, and equations. It makes research more physical and gives it a deeper sense of complexity.
    - Charts and graphs are better than tables and bullet points.
    - Face the audience.
    - Don't use bullet points; just use keywords and talk about them.
    - Don't just read off the slide.
    - Don't feel compelled to explain every detail. Most of them are boring anyways.
    - Emphasize the details you find interesting. Make the talk about you.
    - Don't forget to give credit: just mention everyone you worked with. Be generous with credit since it's not good to make enemies. Besides, it's honest.

- Different types of talks
  - Thesis defense
    - Demonstrate that you have mastered your field
  - Job talks
    - Show how you fit in the department
    - Show your analysis skills
    - Show how capable you are
    - Illustrate deep thinking about physics
    - Don't just expand a conference talk
  - Conference talks
    - If you are going to give a 10 minute talk, only present one idea.
    - You have less scope for making it interesting.
    - It's OK to use lots of words and put in lots of results that you don't address in your talk because it's likely your talk will be publicly available.
    - Proceedings (if there are any) should be an accurate representation of your talk; any ideas that occur after the talk should be footnoted.
  - Seminar
    - For a seminar (approximately one hour), use one theme and five subthemes.
    - Prepare a 50 minute talk for a one hour slot.
    - Encourage audience to ask questions during the seminar and not afterward.
    - You don't need to show what you did as opposed to what other people did (unlike a job talk).
    - You can assume the audience is well-grounded in your field.

    - Be a little conservative in assuming what everyone knows. Use a few introductory slides.
    - Introduce yourself: name, who you are, level, where you are from, and who you work with.
    - Don't use a cookie cutter structure.
    - Start generally and narrow focus in first 10% of the talk (first 5-8 slides).
    - At end of talk (last 10% or 5-8 slides), open up the focus again.
    - Don't just stop after showing your result; explain why the result is important in the larger context.
    - Bring closure to the talk.
  - Colloquium
    - Important to know your audience
    - Similar to seminar: start broad, focus in, and then focus out, **but** do all this more slowly
    - Could be a job talk for a senior position (in this case, an assessment of how well you communicate)
    - Much less detail than a seminar
    - More about what you do, than how you do it
    - More pictures, less equations
    - Stories helpful (e.g. how the discovery took place, who the people were)
    - Need to work much harder in colloquium to engage the audience than in a seminar
    - Don't expand a seminar into a colloquium talk; it's easy for the audience to sense that and then the audience becomes bored.
    - The colloquium is much more formal. Typically, questions are reserved for the end.
    - An opportunity to reach out to people outside your field and inform them
    - Pare down your ideas
    - Only communicate the simplest ideas, rather than trying to conveying the deep elegance that only a few people understand
    - Don't rush
  - Plenary talks
    - Broad in scope
    - Even more important to give credit
  - Popular talks
    - Even more emphasis on explaining clearly, using pictures, and finishing on time
    - Important to practice, consider video taping yourself

Episode 8 - Getting tenure

- Tenure is a big step because:
  - It is a permanent position.
  - Rejection is devastating since the people evaluating you are the people you've been working with for the last 5-7 years.
  - Don't joke about tenure or the tenure process as it is a very sensitive topic.
- Differences among universities
  - Some universities try to intervene early by mentoring and guiding young faculty.
  - A few universities (not many) exert quality control at the hiring stage, so that tenure is a formality.

- Points to be clear on
  - As you get closer to the tenure decision date, prepare yourself for rejection.
  - Know the rules and the procedure.
  - Before you even accept the position, you should have found out:
    * Is the process fair/unfair?
    * Who has input, who doesn't?
    * When does the review take place?
  - Formal rules are set by American Association of University Professors (AAUP).
    * Professors must be evaluated for tenure by their 8th year (this is to prevent universities from stringing junior faculty along).
  - At MIT:
    * After 4 years, there is a review for promotion from assistant to associate professor without tenure.
    * After 6 years, there is a review for promotion to associate professor with tenure.
    * This leaves the 7th year for finding a new job if you are rejected.
- How to get tenure
  - Don't consciously think about getting tenure.
  - Keep a list of people you meet in a text file so that you can use them for references later on.
  - Have self-respect.
  - Be your own person and decide what you want to do.
  - Assess the university as much as it assesses you.
  - Use your time to do what you are excited about and build up your research group.
  - Live your dream!!!
- Duplicity is bad and backfires.
  - Don't choose research directions or collaborations for the sole purpose of getting tenure. People can tell and won't like it.
  - Don't try to solicit offers from other institutions in an effort to game the system. People will figure out what you are doing and get mad.
- Tenure criteria
  - Mainly based on research excellence
  - Showing that you are a leader in your field by getting your name out
  - Giving review talks or writing review articles
  - Giving conference talks or seminars
  - To a lesser extent (depending on university), based on community service and teaching
  - In terms of teaching, people are really thinking about whether you respect the students as opposed to the quality of your teaching
    * Respecting students means keeping appointments, not making students feel unimportant, and grading honestly/fairly
  - Emotionally, people are thinking:
    * Is this a person I want to have in my department for the rest of my life?

        - Is this person competent in administration and will s/he pitch in?
        - Is this person going to choose good research topics and be a pioneer as opposed to just following the pack?
    - No shortcuts or magic formula to getting tenure (the faculty don't use a checklist)

- Community service
    - There are lots of jobs/committees and they (for the most part) are not fun.
    - Find your niche: choose a job, take it over, and do it well.
    - If you do the same job for a long time, it will get easier and take less time.
    - If you want to make yourself stick out, choose a job that is unpopular like colloquium/seminar organization or graduate admissions.

- Giving talks
    - Most seminar organizers are lazy and have a hard time finding speakers so take advantage of that.
    - In July, email organizers and volunteer to give talks at good universities.
    - Advantages of seminars over conference talks
        - At a conference, you are typically giving a 10-20 minute talk in a two hour session – you can easily be missed.
        - But you have a whole day at an institution for a seminar - 1 hour for the talk, dinner and appointments.
    - Colloquium tenure talk
        - Typically you will be asked to give a colloquium on your work in preparation for the faculty voting on you.
        - Make sure this colloquium is **really** accessible since it will be attended by faculty outside your field.
        - Communicate clearly what you did and why it was important.
        - Communicate clearly what students were involved and how you are connected to them. Show your mentoring skills.

- As the tenure review date approaches, know your time scales and options.
    - Some people try to look for other offers at this time.
    - Only consider offers you are serious about.
    - Let your university know what you are doing.

Episode 9 - Teaching

Introduction

- Teaching happens anytime you interact with students or colleagues, not just in the formal lecture setting.
- If you're a good teacher, you will find that teaching goes both ways: you are teaching your students and colleagues, and they are also teaching you.
- You want to organize an academic class in a way that is pleasurable and efficient for both you and students.

- Keys to lecturing well
  - Preparation
  - Finish on time without hurrying
  - Respect the students
  - Keep a tight feedback loop
- What doesn't work: keeping a lecture or two ahead of the students because you will end up with a course that meanders. No, an outline is not good enough.

First time teaching the course

- When you start off, most universities will give you a tour of duty that involves teaching the same class three times in a row.
- Prepare the course well in advance. At the start of the course, have a rough draft of every single lecture (i.e. everything you will say and write on the blackboard) and a rough draft of every problem set. Yes, you read the last point correctly. You need to prepare a rough draft of every lecture and every problem set. A class is a lot of work and the more of it you do ahead of time, the better.
- You need a clear idea of your goals, so that you can assign useful problems in the problem sets.
- Know your audience and your studentss capabilities; ask your colleagues who taught them the term/year before.
- You need to constantly be adjusting the course to keep a balance between overwhelming and boring the students.
- It's easy to find out if you're meeting that balance; just ask the students and section instructors.
- It's a good idea to have a staff meeting every week for the course (usually 15-30 minutes is sufficient).
- In order to finish each lecture on time without hurrying, you will have to practice every lecture.
- Practicing every lecture means practicing in real time with blackboards and a timer.
- Peter won't cover the many aspects of lecturing (pacing, legible writing, presentation, etc) since there are books and media available on these topics.

Logistics

- You need to have respect for the students, and they need to respect you.
- The way to make this happen is to make clear your expectations of them and what they should expect from you.
- Expectations is really about laying out boundaries.
- Within your boundaries, you will be completely engaged in teaching, and outside of those boundaries, spending more time on teaching is optional.
- Lay out your expectations right away at the beginning of the course.
- On the first day, hand out a one page sheet of expectations.
- Reasonable expectations for you

  - You should finish your classes on time.
  - Problem sets should be graded and returned with solutions in a timely fashion. Problem sets and exams should be returned within a week maximum, preferably shorter because after that, students forget the material or the material becomes irrelevant.
  - The textbook should be chosen at a reasonable level.
  - Students should find you available to discuss the course.
- Reasonable expectations for students
  - Students should not bother you when you don't have office hours or an appointment scheduled.
  - Students should not complain about their grades.
  - Students should attend class on time.
  - Students should make an honest attempt to complete their work.
- When you hold office hours, you should really be available (i.e. waiting for students) and not doing other work.
  - Peter likes to reserve a tutoring room and bring a magazine.
  - Peter thinks it is useful to have office hours a few hours before the problem set is due so that you get a lot of students and can generate a lively discussion.
- You should encourage students to email you with questions.
  - Students should expect a thoughtful, timely response to a reasonable question.
  - But they should not expect that they can send you a 4 page long email anytime and expect a response.
- Problem set/project due dates
  - You should recognize that like yourself, students have complicated lives with many competing demands and it can be difficult to meet "arbitrarily set" deadlines.
  - Peter's take: students should meet deadlines, but if they need extra time, they should tell the instructor and propose a new due date subject to instructor approval. If the instructor is not going to start grading the problem set/project soon anyways, it makes sense to give the student some extra time.

Teaching

- You should look at students while you lecture. Are they engaged, bored, or lost?
- If they looked lost or disengaged, you should stop lecture and ask them what's wrong.
- You should talk to students informally before/after lecture and during office hours to get feedback.
- Course evaluations come too late, and they just confirm what you knew already.
- Try to find out who the students are and what they are interested in. Show an interest in their lives.
- Anything you can bring into the course from your research or experience is valuable because you will be passionate about it.
- Find ways to make your teaching more efficient
  - Example: if you screw up in lecture, write up an explanation and pass it out in class rather than going over it on the blackboard.

  - Idea: set up a video camera and videotape a blackboard derivation.

- Section teaching
  - Your role is not to give another version of lecture or to do problem sets for the students.
  - In first five minutes of class, figure out what the students need help with and make an agenda out of their questions and concerns.
  - Group related questions together in the agenda.
  - Spend the rest of the time going through the agenda and addressing students questions in a Socratic dialogue.
  - Make students feel like section is their time.

- Teaching graduate students
  - Mainly, you teach them to do your research for you.
  - But take some time to prepare mini-lectures about things they should know but won't learn about in class (think about what you wish you had known as a grad student).
  - Try to meet with your graduate students weekly.
  - It is good to teach your student something at every meeting.
  - It is also a good idea to have everyone teach each other at group meetings.

Conclusion

- Remember that teaching is pleasurable because you spend a lot of time with students who are interested in the same things you are and want to learn from you. Students are endlessly fascinated with faculty: how you got there, where you went to school, what research you conduct.
- Just make sure this stuff doesn't spill into teaching time. Set your boundaries.
- In contrast, most of your colleagues are just concerned with their own research and not really interested in what you are doing.

Episode 10 - Vacation

- Your life as a professor will involve a lot of administration and meetings, managing people, and reviewing other people's performance. All of this stuff wears down on you, and you need to take a vacation that gives you a respite from these responsibilities.
- If you don't take a vacation, your body and mind will impose a little vacation on you. Frequently, this appears as a lot of drinking, a short temper, or inattention.
- Requirements for a vacation
  - Don't respond to email. Set up an auto-responder.
  - Vacations should not be work of a different kind (e.g. fixing up the house). It should be unstructured time with no goals, deadlines, or appointments.
  - You have to remove yourself from your daily mode of thought and your daily routine (e.g. no reading physics papers on vacation).

  - Minimum of two weeks of vacation a year. You are typically paid 9 months a year by the university and up to 2 months by your research grant, so there is one month every year where you should not feel obligated to do anything. We need to push back against the university and colleagues who demand that we work all the time. This is hard to avoid in the modern age where we can potentially work anywhere with a laptop and wireless internet.

- How to plan a vacation
  - Treat your vacation as a project.
  - Start thinking about your next vacation 1-2 months after you get back from your last vacation (e.g. make a project heading in your todo list).
  - The vacation project will be a source of positive energy every time you review your project list during your weekly review.
  - If you have family, make it clear to yourself whether or not visiting your family is vacation.
  - If visiting family is actually fulfillment of an obligation, that does not count as vacation.
  - Remember that vacation is an investment that pays dividends.
- Encourage your colleagues (grad students, postdocs) to take vacations.
- Advisors should tell their grad students and postdocs that it's okay to take vacations.
- In particular, people who have children really need to be careful about setting aside time for themselves and their relationship with their spouse. Their time will be eaten away by work and taking care of the children, but the relationship with the spouse is really important to both being productive and having a good family.

Episode 11 - What to work on

- Science is fluid, and often there are academic fashions.
- Be true to yourself and work on things that are important and that you find interesting.
  - "Important" is determined by the community (public decision).
  - "Interesting" is what gets you out of bed. If it's not interesting, you won't do your best work.
- Consider the project's timescale and the resources you need
  - Generally these will be underestimates, but remember this is a rough plan subject to change
  - Don't force yourself to stick to the original plan.
  - Resources include money, time, collaborators, students.
  - Peter finds that money is not so important at the beginning stages. If you have a really good idea, getting initial funds is not too hard.
- Getting funding
  - As time goes on, the scope and costs of your project become more clear.
  - You start competing with established projects.
  - For funding agencies, it is important to have a good story, meaning a narrative that expresses why this is important, how it fits in with other work, what's unique about it, what the opportunities are, and how it connects with students.
  - Notice that this narrative is not directly related to the scientific case.

  - But realize that agencies are concerned with other matters besides scientific merit. They might be interested in professional development, building up key research areas, or outreach.
  - The most important thing is that they understand your ideas and why they should fund it. Express yourself clearly.

- What happens when you apply for a grant
  - You submit a proposal. The proposal goes to a program office.
  - The program officer has a budget and has to fight for that budget out of the overall budget from the federal government.
  - The easier you make it for the program officer to defend his/her program, the more likely your grant will be funded.
  - You might consider meeting with the program officer and explaining what you want to do.
  - It's not so important that the idea be mainstream.
  - Again, the most important thing is that you explain why your idea is good and why it should be supported.

- Collaborations
  - Building collaborations is a sensitive topic.
  - Be honest (don't lie).
  - Be clear and say everything without hiding anything.
  - It is unlikely that anyone will steal your ideas.
  - Even your competitors will appreciate forthrightness.
  - Your competitors can be worthwhile collaborators on an informal basis. Compare notes with them.
  - In beginning, don't be too choosy about collaborators.
  - However, if someone treats you badly, tell them immediately and in stark terms.
  - Insist on respect right away. Don't wait until later.
  - Perhaps your most important resource is your collaborators.

- Students
  - Be honest with graduate students about their prospects for a thesis, especially at the beginning of the project.
  - Undergrads can work on risky projects that don't necessarily pan out.
  - The senior thesis doesn't have to be a successful project; it can just be a valiant attempt.

- Department/university resources
  - Talk to chair about getting research leave or time off teaching.
  - Asking for a semester leave is a lot.
  - See if you can get a few weeks off here and there at crucial moments in the project (e.g. when a big piece of equipment comes in).
  - Try to get off committee assignments.
  - Negotiate for lab space.
  - When talking to dean or chair about resources, make it clear how the money will be spent.
  - You will have much more leverage if the money is going to be spent on supporting students as opposed to supporting you directly.
  - Be ready to talk about your work for departmental/university-wide fund raising.
  - Give credit to funding agencies in presentations and papers.

Episode 12 - Summary of main points

- The greatest advantage of academic life is the freedom to do what you want (within some constraints).
  - You are encouraged and allowed largely to decide what you're going to do and how you're going to do it.
  - This kind of freedom is very rare in life.
  - Therefore, don't work on projects solely to get funding or tenure.
  - The academic career is about following your heart.
- The academic career is about being free and open in your interactions with people.
  - That means being available, even if you don't want to be available.
  - Peter tries to keep his door open at least half the time that he's in his office.
- Avoid busyness, streamline things as much as possible, and make hard decisions not to do things.
  - Busyness means doing administration and other "easy" tasks that aren't really important.
  - It's easy to take on too much.
  - It's easy to become burdened by administration and do those tasks because they are easy whereas research and deep thinking are hard.
  - Don't fall into that trap.
- Mindfulness
  - Live in the moment.
  - Don't spend time dwelling on the past or worrying about the future.
- Work and family
  - Many people in academia shaft their families.
  - But keep in mind, that the happiest people in academia are those who struck a balance between work and family.
  - These people were with their family and children all through out their lives, not just at convenient moments.
  - You need to have clear boundaries between work and family.
  - Don't answer email on a laptop and try to watch your child at the same time.
  - Think about your life 20-30 years from now.
  - Research is transitory and ephemeral whereas friendships and family are long-term.
- Career is a natural progression of stages.
  - Don't let career concerns dominate your thinking.
  - Again, going back to the idea of academic freedom, don't work for the sake of tenure, funding, fame, etc.
  - Enjoy your academic freedom.

Appendix: Office revenge

> There are going to be those situations where you are going to want to retaliate and in general, I counsel against that. Satisfying as it is, it usually doesn't achieve its end; it really doesn't make things better. However, if you feel that you just really have to retaliate, a really interesting thing to do, particularly during the summer, is, if the person has an office or a desk or something, get a fish. And depending on whether it's a large office, you might want a larger fish, a bluefish or something. A smaller desk, maybe a herring. Wrap it tightly in foil and hide it really really well. And what happens is as the fish begins to rot, there's just this kind of lingering odor which never quite gets bad enough to do anything about but is obnoxious. And especially if you get the right kind of fish, it smells vaguely human. Again, I don't recommend this, but if you really have to do something, this is a pretty good thing to do.
>
> - Peter Fisher, Sequence II, Episode 2

References

[1] About the Fisher Files. `http://scripts.mit.edu/~podcast/wordpress/about/`

[2] William Strunk, Jr. and E. B. White, *The Elements of Style, Fourth Edition*. Longman, Needham Heights, MA 1999.

Further information

The Fisher Files podcasts can be found at `http://scripts.mit.edu/~podcast/wordpress/`. Peter Fisher is a professor in the MIT physics department. TY thanks Peter for taking the time to produce these podcasts.