

# Establishing a Research Program: Selecting Questions, Managing a Team

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# My own career path

- 1991 Undergraduate – Biochemistry, PUCV, Chile
- 1994-1999 PhD – Pharm/Phys, St Louis University
- 1999- 2004 Postdoc Neurobiology, Duke University
- 2004- 2010 Assistant Professor, University of Pittsburgh
- 2010 - Associate Professor, University of Pittsburgh

# GETTING STARTED

- Setting the Goals
- PhD Student
- Postdoc
- Assistant Professor
- Associate Professor

What is the goal? How do you get there?

"It took me over forty years to learn from experience  
what can be learned in one hour from this guide."

— Carl Djerassi

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# A Ph.D. Is Not Enough!

*A Guide to Survival in Science*

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**Shrewd Advice for Aspiring Scientists:**

- \* Choose a career path and the right advisers
- \* Establish an identity; communicate effectively
- \* Win a research job and keep it
- \* Select a viable research program; get it funded

**An invaluable pocket mentor!**

**Peter J. Feibelman**

You have three important tasks in your postdoctoral years:

1. You must decide in what area of science to make your name.
2. You must *finish* at least one significant project.
3. You must establish your identity in the research community sufficiently to land an assistant professorship or a junior position in an industrial or government laboratory.

- Peter Feibelman, *A PhD is Not Enough!*

# Postdoctoral Training is Critical

- This is the first step of your career as an independent scientist
- It's a transitional position, not a job
- You are responsible for your success
- Define your own goals
- Work with your advisor to attain both your research and career goals

# Four things you must accomplish

- 1) Decide what area of science you want to pursue (or alternate path you want to take)
- 2) Finish at least one significant project
- 3) Establish your identity in the research (or teaching/political/editorial) community
- 4) Learn how to communicate effectively (written and verbal)

# 1. Selecting the Problem

- Define a problem. Find what excites you  
Read A LOT, Get advice (from everyone), Go to seminars, go to meetings (meet the experts), Watch for opportunities
- Try to avoid the problems everybody is working on
- Ask yourself is this really an important problem?
- A well-chosen problem is important, hasn't been studied much, and you have a great idea for how to solve it



# Selecting the Problem

- You should have a line of research involving many focused studies and a stream of papers
- Reputations are built on programs of research
- It might take a dozen related studies over 10-15 years to make real progress on a problem
- You need to develop the expertise that comes with extensive and focused experience

# Selecting the problem

- Define your interests.
  - Cardiovascular
    - Hypertension
    - Stroke
  - Neuroscience
    - Autism
    - Regulation of the glutamate activation by nicotine in the in hippocampus.
    - Regulation by serotonin of the anxiety pathways.
    - Effects of fluoxetine treatment on obsessive compulsive behavior
    - Developmental Research vs Aging

# Ask questions while you read/listen

What assumptions are being made?

Are these conclusions justified?

What else might be happening?

What would I do next?

What's missing?

How might this relate to my system?

How else can this information be used?

## 2) Finish at least one significant project

‘Finished’ means published!!

### Successful Research Program

- How does your discovery fit in the context of the field?
- What is the single important question you can address?
- What data is needed to tell a compelling story?
- “Home-runs” are great, but think strategically and take the “base hits”
- Collaborate with and contribute to other projects (make yourself useful)

Be alert for the unexpected!!

# How many papers is enough?

It depends.....

1) Play the numbers game:

Plan your research as a series of focused, complete projects. Ask important, but well-defined questions

2) Successfully tackle a very difficult, very important and/or very novel problem

3) Both: inside every big problem are several smaller Problems

4) Develop an alternative project

### **3) Establish your identity in the research community**

- You will need 3-4 letters of recommendation for an academic job
- Talk to other faculty members about their research and yours
- Present your work, whenever possible
- Learn what others around you are doing and be helpful
- Go to seminars and ask questions

## 4) Learn how to communicate effectively

- Write a compelling grant
- Write effective emails
- Write a clear paper
- Give organized presentations
- Describe your research to others



# GETTING STARTED

- Having made some decisions, what do I do next?
  - Start Looking.
  - Get interviews
  - Be Proactive
  - Follow-up



# To get an interview, you will need:

A compelling cover letter, tuned to the job

A strong CV/resumé:

- Solid accomplishments at each stage of your career
- Evidence of competitiveness (awards, fellowships)

A statement of research interests: past, present and future (2-3 pages):

- make it linear, self-deterministic
- emphasize significance of your work in the Big Picture
- briefly describe future plans, i.e. an NIH grant summary

A little help from your mentors:

- ask them to write a “good letter”
- help them by giving them names and phone numbers
- have them read and critique your research statement

# To get a job, you will need:

A well-prepared and interesting seminar:

- tell a story
- be authoritative
- make the future directions clear

The ability to interview well and think on your feet:  
(broad knowledge obtained by attending seminars helps)

A well thought out plan of research:  
an NIH grant's worth of Specific Aims, back-up plans,  
big picture future directions

To be a good fit:  
research and know your prospective colleagues and the  
institute

# INTERVIEWS

- At the Interview
  - Ask about the Faculty
  - Ask about Facilities
  - Ask about Productivity
    - Who has R01s
    - How are indirect costs distributed?
  - Ask about expectations
    - Grants per year
    - Publications per year
    - Time-line for promotions
      - Assistant Professor => Associate Professor => Professor
    - Service (Committees)
    - Administration

# INTERVIEWS

## At the Interview

- Ask about postdocs
- Ask about graduate students
- Ask about collaborations between Faculty
  - Ask to speak to a faculty with grant funding

# NEGOTIATING

## At the Negotiating Table

- Find out why they are hiring you
  - You should have a clear idea after the interview they need you because of certain skills you have.
- Have a list of what you will need
  - Negotiate your salary
  - Negotiate your space
  - Negotiate your startup funds
  - Negotiate your protected time

# What skills do I need in Academia?

- Teaching Experience
- Research Experience
- Publications
- Grant Writing
- Negotiating Skills
- Interpersonal Skills
- Mentoring Skills
- Odd Skills

# What skills do I need in Academia?

- Research Experience
  - Experimental Design
  - Hypothesis, Rationale, Justification, Significance
  - Protocol Notebook
  - Gather information on supplies and suppliers
  - Make sure you take a copy of each experiment you did as a graduate student or postdoc.
  - Data Analysis
  - Presentations
  - Statistics
  - Innovative Ideas
  - Have a 1 year plan, a 5 year plan and a 10 year plan.

# What skills do I need in Academia?

- Grant Writing
  - Get information
    - Ask a Mentor
    - Go to the Web
    - Office of Research Administration
    - Dean of Research
  - Start small, but start soon
    - Foundation Grants
    - Pharmaceutical Companies
    - Governmental Grants
      - Predoctoral and Postdoctoral Grants
  - Attend Workshops



# What skills do I need in Academia?

- Publications

- Write
- Write
- Write
- Write your own papers
- Write as you go
- Design your experiments with a paper in mind
- Make a mock paper with expected results
- Submit

# What skills do I need in Academia?

- Negotiating Skills
- You will need to
  - Negotiate for a desk
  - Negotiate for a lab space
  - Negotiate for a project
  - Negotiate for authorship
  - Negotiate for equipment
  - Negotiate for a trip
  - Negotiate for a committee
  - Negotiate your salary

# What skills do I need in Academia?

- Interpersonal Skills
  - Be a team player
  - Understand the different personalities
  - Understand the different cultures
  - Understand the different expectations
  - Build Networks
  - Find a Mentor
  - Be an Advocate for your Department
  - Be a Mentor

# What skills do I need in Academia?

- Odd Skills
  - Graphics designer
  - Engineering
  - Electrician
  - Carpenter
  - Plumber
  - Computer expert
  - Inventor
  - Politician
  - Councilor
  - Psychiatrist
  - Survivor
  - Multitasker

# What skills do I need in Academia?

- **Mentor Skills**
  - Graduate students
  - Postdocs
  - Technicians

# Manage a Team

- Work in a team, learn to delegate
- Meet individually and as a group
- Provide constructive criticism
- Congratulate achievements
- Apply the two lines of research approach

# Multitasking

- Learn to use your time effectively
- Prioritize
- Delegate
- Make a Tower
  - Place everything you need to do in a tower and attack each one as it comes.
- Be flexible
- Be adaptable

# Multitasking

- Teaching
  - Teaching
  - Preparing Lectures
  - Revising lectures
  - Preparing exams
  - Office Hours
  - Proctoring
  - Curriculum development



# Multitasking

- Research

- Grant writing
- Experimental Design
- Analyzing data from technicians, postdocs & graduate students.
- Training
- Searching/selecting/buying
- Negotiating with vendors
- Emergency planning
- Forward thinking

# Multitasking

- Administration
  - Committees
    - Admissions
    - Grievance
    - Research
    - Curriculum
    - Library
  - Faculty Senate
  - Consultant/Advisor
  - Recruitment

# TIPS

- Be your stronger supporter and advocate
- Find Mentors
- Ask for help
- Manage your time effectively
- Get educated/ Be prepared
- Think outside the box
- Get the skills you need
- Hope for the best
- Reach for the stars

ANTICIPATION!!



# Be Patient but Reasonable



**Albert Einstein**  
b. 1879

**Age**  
23 Began work at Patent Office  
26 *Annus mirabilis*  
32 1st permanent post  
42 Won Nobel Prize

**Researchers today win their first competitive NIH grant at a median age of 42. These three scientists won Nobel Prizes at that age.**



**Marshall Nirenberg**  
b. 1927

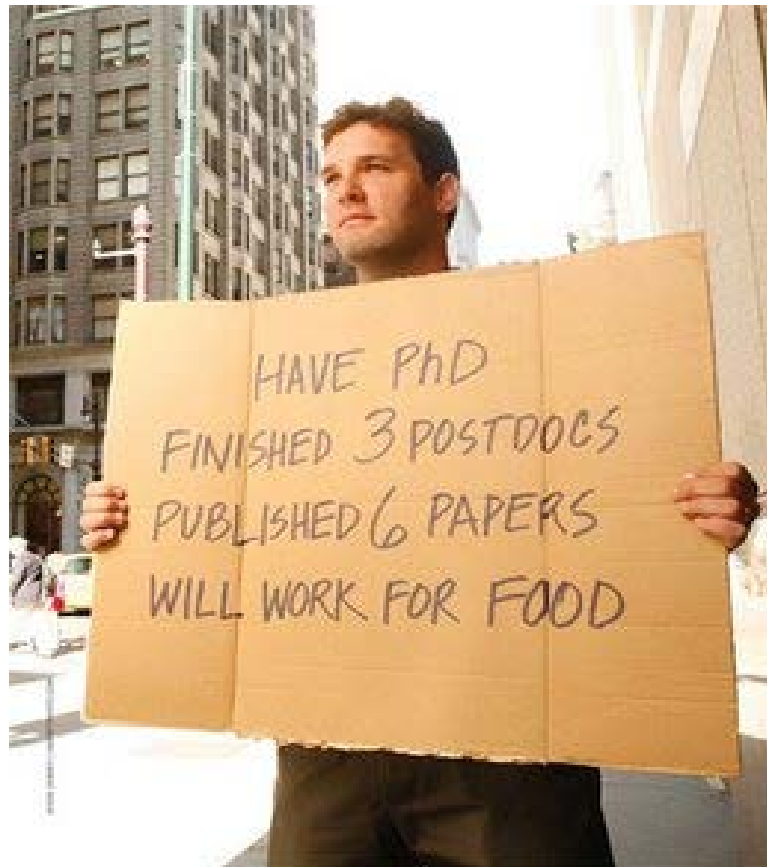
**Age**  
21 Received B.S. in zoology from University of Florida, Gainesville  
25 M.Sc. in zoology from University of Florida  
30 Ph.D. in biochemistry from University of Michigan, Ann Arbor  
32 Postdoc at NIH  
33 Appointed research biochemist at NIH  
35 Made section head, Biomedical Genetics, NIH  
38 Won National Medal of Science  
41 Won Nobel Prize



**Thomas Cech**  
b. 1947

**Age**  
19 Entered Grinnell College  
23 Started grad school at UC Berkeley  
28 Earned Ph.D. from UC Berkeley  
Started postdoc at MIT  
31 1st faculty position (University of Colorado, Boulder)  
41 Appointed Howard Hughes Medical Institute Investigator  
Albert Lasker Award in Basic Medical Research  
42 1989 Nobel Prize in chemistry

# Don't underestimate yourself



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