A Path to Careers Beyond the Bench: Science Administration and Careers in Government

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Outline of Today’s Presentation

- Training and Research History
- Science Administration in the Government
- Resources and Fellowship Programs
- Other Government Career Tracks
Training and Research History
How I Ended Up in Scientific Research

- B.A. in Biology, Neuroscience and Behavior (Wesleyan University, Middletown, CT, 4 years)
  - While there spent most summers working in campus libraries and/or research laboratories—summer fellowship programs (McNair, Howard Hughes)
  - Turning point—summer fellowship at UConn Health Sciences Center, mix of shadowing medical doctors and research in laboratory
- Research Tech/AUC Facility Director (Albert Einstein College of Medicine, 2 years)
- Ph.D. in Biochemistry and Biophysics (Univ. of North Carolina-Chapel Hill, 5 years)—Ford Foundation Predoc Fellow
- Postdoc in Laboratory of Receptor Biology and Gene Expression, Hormone Action and Oncogenesis Section (National Cancer Institute/NIH, 5 years)—UNCF/Merck Postdoc Fellow
Research Background

- Mapping axonal projections from the cochlear nuclei following auditory signalling
- DNA-dependent protein kinase mutations in SCID mice, deficit in hippocampal neurons, and defects in learning and memory
- Biophysical characterization of protein and nucleic acid conformational changes—TBP self-association, galectin oligomerization, and ribozyme conformational changes
- Role of histone modifications—acetylation and methylation—in transcriptional elongation; histone methyltransferase enzymes
- Role of chromatin remodeling in glucocorticoid receptor transcription activity
- Genome-wide chromatin remodeling and regulation of DNA accessibility
What to Do After Postdoc?

- **Academia? NO.** I knew from the start of my postdoc, coming from grad work in a newly started lab that I did not want to spend my time writing for funding, with the lives of others in my hands.

- **Industry?** Maybe. At postdoc start, I was leaning towards this direction with a 3-year postdoc in mind.

- **What else?**
“Alternative” Career Options?

- Besides working at the bench 10-12 hrs a day, 5-7 days a week---the usual—I also took advantage of making the most of my time at the NIH.
- Not operating in a postdoc silo--3000+ postdocs, a variety of fellow committees, groups, teaching opportunities, etc.
- Chose one extracurricular activity during my second year and ran with it for 4 years—NIH Fellows Editorial Board.
  - Offers NIH and FDA research and clinical fellows a free, confidential scientific document-editing service (10 day turnaround time; manuscripts, reviews, grant proposals); For fellows by fellows.
  - Board members gain editing training and experience.
  - Worked my way up from volunteer editor to Associate Editor to Senior Editor responsible for interacting with authors, finalizing editorial reports, recruiting and managing volunteer editors.
- Started chromatin seminar series for fellows with labmates (still going strong).
What Did I Apply For?

- Transferable skills—communication skills (oral, writing); managerial skills; ability to work in teams/work alone; knowing my science (# 1 skill); writing and receiving funding
- Able to provide concrete examples in resumes
- 30+ applications

NCI Health Scientist Administrator—past 3 years in the NCI Office of Cancer Nanotechnology Research
Science Administration in the Government

What is a Health Scientist Administrator?
National Institutes of Health (NIH):
Part of US. Dept. of HHS; 27 Institutes and Centers

- ~10% of budget for intramural support
- ~82% of budget for extramural support
- ~63,000 grants and contracts

NIH Campus – Bethesda, Maryland
322 acres
Intramural vs. Extramural

- The intramural program is the internal research program of the NIH
  - Very much like academia, except investigators do not have to write for funding; federal employees/Title 42
  - 1,200 PIs and more than 4,000 postdocs
  - Laboratories are reviewed retrospectively every four years; stressful and rigorous review
  - Ample opportunities to collaborate within and between Institutes

- Extramural component of NIH supports basic and translational research outside of the NIH; across the US and around the world
  - Awards contracts and grants (including cooperative agreements, center awards, training fellowships)
  - Every Institute has an extramural component supported by Institute Directors, Health Scientist Administrators, Science Policy Analysts, etc.
Science Administration and the Grant Cycle

- At the NIH, Health Scientist Administrators responsible for:
  - Initial administrative, scientific, and technical review of NIH research grant applications
  - Duties include: organizing and managing peer-review groups for research proposals/applications; managing extramural research and training programs; identifying research areas in need of increased or decreased funding; developing funding opportunity announcements; providing assistance to applicants; serving as agency spokesperson when dealing with the scientific community, Congress, and other Federal agencies
Science Administration and the Grant Cycle

Solicitation Posted; Application Period Begins

Application Review

Award Notification

Post-award Notification

Grant Closeout

Program Officer (PO)

NIH Health Scientist Administrator

Scientific Review Officer (SRO)

PO: Seek input from researchers; Develop and defend research concepts; Develop and publish FOAs

PO: Assigned/select incoming applications; review for responsiveness (RFAs)

SRO: Recruit peer reviewers; organize review meetings; interact with applicants during review

PO: Interact with applicants once summary statements of review are out

PO: Administer and monitor awards

Solicitation Posted; Application Period Begins

Application Review

Award Notification

Post-award Notification

Grant Closeout
Mission: “...to create and uniquely implement exploratory programs focused on the development and integration of advanced technologies, trans-disciplinary approaches, infrastructures, and standards to accelerate the creation and broad deployment of data, knowledge, and tools to empower the entire cancer research continuum in better understanding and leveraging knowledge of the cancer biology space for patient benefit...”
NCI Alliance for Nanotechnology in Cancer Program (Alliance)

- Supported by NCI’s Office of Cancer Nanotechnology Research
- The Alliance works in concert with other NCI advanced technology initiatives to provide the scientific foundation and team science required to transform cancer research and benefit the patient

**Director**
Piotr Grodzinski, PhD

**NCI Alliance Phase II**

- Phase I: 2005 – 2010
- Phase II: 2010 – 2015
- **Phase III: 2015 – 2020** (new awards announced at start of September!)

- Alliance’s development model—most promising strategies handed off to for-profit partners for effective translation and commercialization
- **Scientific output** – Total over 1500 peer-reviewed journal papers and close to 300 patent filings and disclosures
- **Clinical translation** – over 75 companies in the space of diagnostics and therapy are associated with the program. Majority of them are start-ups.
  - 17 on-going clinical trials are associated with program projects
  - Several companies are in IND or pre-IND discussions with US FDA

- **Centers of Cancer Nanotechnology Excellence (CCNE)**
  - U54 Cooperative Agr.

- **Cancer Nanotechnology Platform Partnerships**
  - U01 Cooperative Agr.

- **Multi-disciplinary Training**
  - K99/R00 Awards, R25 Awards

- **Nanotechnology Characterization Laboratory (NCL)**
  - Serves as national resource to aid regulatory review of nanotechnologies
What Do I Do Everyday?

- **You get out, what you put in**

- I do a variety of things; everyday is different
  - Lots of deadlines and writing—some very short; others are long, drawn out projects
  - Manage a portfolio of cancer nano centers and projects (interact with investigators, review progress reports and interact with grants management, small part of job); advise investigators and potential applicants
  - Identify and develop new research concepts and put together funding opportunity announcements (most recent—Phase III Alliance program; working with other program staff on epigenetics topic)
  - Organize and conduct workshops, sessions at meetings; participate in workshops; give presentations as NCI/NIH representative and cancer nano office representative; prepare Congressional justifications for funding nano; write opinion pieces and review articles; in the middle of editing a book on nano
  - In charge of all things nanoinformatics in my office—run two nanomaterial databases, select publications for curation; oversee contract for the development of one of these databases; interact with community, journal editors/publishers to improve data sharing, standards development
  - Serve on several working groups and committees—NCI, NIH, multi-agency, investigator-focused
  - Serve as proposal evaluator for other programs and agencies

- **My Outlook calendar and I are very close**
Typical Characteristics of a Successful Health Scientist Administrator

- Know your science! Most positions require specific type of expertise, especially for Scientific Review Officer positions
  - Expected to have research accomplishments reflected by publications, funding received
- Ability to communicate—in writing, oral presentations (write and understand science, lay audience)—interview process includes presentation on your work
- Management experience
- Ability to work with others—may have many solo projects, but often you are working as part of a team; must be able to interact with investigators at all levels
- Where to find job postings—individual Institute sites; ultimately posted and apply through USAJobs, [www.usajobs.gov](http://www.usajobs.gov)
Resources and Fellowship Programs

*How I Got My Job and Preparation Outside of the Bench*
Activities Outside of the Bench (?)

- Scientific knowledge and lab skills are very important for non-academic positions, but not necessarily enough

- Some of these core skills that can be adapted to other positions:
  - Ability to learn
  - Independence and ability to drive a project/program
  - Team work experience gained through collaborative projects
  - Ability to juggle multiple projects and/or experiments
  - Writing experience gained through writing papers—need to explain why your work is important and how it fits into the greater research landscape for your field

- Already discussed/mentioned NIH Fellows Editorial Board and development of chromatin seminar series; generally worked hard at research and getting published, invited to give presentations; networking (start establishing collaborations early during training—peers, other labs, during conferences and seminars); informational interviews (did 8-10)
Resources and Fellowship Opportunities

- Science Careers website—sciencecareers.sciencemag.org
  - Articles on graduate training and careers; job postings

- Other science job sites—Cell Career Network (careers.cell.com); naturejobs.com

- NIH’s Office of Intramural Training and Education

- Informational Interviews

- Relevant Fellowships
NIH Office of Intramural Training and Education (OITE)

- https://www.training.nih.gov/
- Mission is to enhance training experience of students and fellows, within/outside NIH
- Provide career/professional development workshops, seminars, and one on one advising
- For those outside of NIH, provide access to career development resources as online materials and via videocasts, YouTube
- OITE Careers Blog--https://oitecareersblog.wordpress.com/?
- Staff also travel to colleges/universities, research institutions to provide information; email them if interested-wardb@mail.nih.gov
- Hold Annual NIH Career Symposium—highlights diversity of career choices; open to intramural and outside--https://www.training.nih.gov/events/view/_2/1577/8th_Annual_NIH_Career_Symposium
**Informational Interviews**

- [https://www.training.nih.gov/assets/Informational_Interviews.pdf](https://www.training.nih.gov/assets/Informational_Interviews.pdf)
- To me, one of the best ways to learn about different careers
- Basically interviewing someone and asking them about their job, how they got it, how they like it; learn about future career opportunities for someone in that position
- Usually ends with the names/contact info of other people to talk to next; other resources that you may want to investigate
- As you see in the handout, this is not a conversation in which you ask for a job, but to learn about different jobs
- Another outcome, you are often building your network by connecting with these different people
- I interviewed about 8-10 people; some led to my next interviewees, most were connections made by people I knew from lab, fellowship program, editorial board, etc.
Enhancing Public Policy, Transforming Careers: AAAS Science & Technology Policy Fellowships

**GOAL:** Foster scientifically informed, evidence-based policy and practice

**STRATEGY:** Engage scientists and engineers from a broad range of disciplines, backgrounds and career stages to (recent PhDs to tenured faculty to retired scientists and engineers):

- contribute knowledge and analytical skills to the federal government;
- learn first-hand about policymaking and implementation at the federal level
- One to two year fellowships

**OUTPUT:** Policy-savvy scientists & engineers

**AREAS:** Diplomacy, Security & Development; Congressional; Energy, Environment & Agriculture; Health, Education & Human Services

- NIH sponsors 20-30 fellows per year

Fellowships & Resources

AAAS S&T Policy Fellowships--
http://www.aaas.org/program/science-technology-policy-fellowships

Questions? - fellowships.aaas.org

- Partner Society Fellowships
- Resource section on other fellowships

Deadline: Nov 1, Applications open May to November

- Fellows often remain in agencies following their fellowships

California S&T Policy Fellowships
www.fellows.ccst.us

ASBMB Science Policy Fellowship Program (usually one fellow/year)
http://www.asbmb.org/advocacy/Advocacy.aspx?id=14744

Genetics and Public Policy Fellowship (usually one fellow/year)
http://www.genome.gov/10003979
Other Government Career Tracks
Science Communication

- Technical writing; communication and education, lay audience
- **AAAS Mass Media Science & Engineering Fellows Program**
  - For those interested in communicating complex science to the public
  - Places engineers, scientists at media organizations across the country for the summer (advanced undergrads, grad students, post-grad)
  - [www.aaas.org/programs/education/MassMedia](http://www.aaas.org/programs/education/MassMedia); deadline Jan 15, 2016

- **NCI Health Communications Internship Program**
  - For those interested in health communications or science writing
  - Six-month and one-year internships offered for placement in an NCI office; grad students, recent grad students
Regulatory Science

- U.S. Food and Drug Administration; a few relevant fellowship programs

- **Commissioner’s Fellowship Program**
  - Open to engineers, scientists, and health care professionals interested in regulatory science training; perform research under FDA senior scientist guidance
  - Two year fellowship program; Eligible to PhDs, engineers with BA/Masters’
  - [http://www.fda.gov/AboutFDA/WorkingatFDA/FellowshipInternshipGraduateFacultyPrograms/CommissionersFellowshipProgram/default.htm](http://www.fda.gov/AboutFDA/WorkingatFDA/FellowshipInternshipGraduateFacultyPrograms/CommissionersFellowshipProgram/default.htm) --March 2016

- **Interagency Oncology Task Force Joint Fellowship Program**
  - NCI, FDA joint fellowship program offer training in cancer-related scientific research and research-related regulatory review
  - Four programs/tracks, up to 3 years, 2 fellows/year; Eligibility varies by program—MD, PhD
  - [http://iotftraining.nci.nih.gov](http://iotftraining.nci.nih.gov) – due dates vary; January to August
NIH Intramural Research Program

- Internal research program of the NIH; [http://irp.nih.gov/](http://irp.nih.gov/)
- 1,200 Principal Investigators and more than 4,000 Postdoctoral Fellows conducting basic (~15%), translational (~55%), and clinical research (30%)
- IRP is the largest biomedical research institution on earth
- Responsible for many scientific accomplishments, including the discovery of fluoride to prevent tooth decay, the use of lithium to manage bipolar disorder, and the creation of vaccines against hepatitis, Haemophilus influenzae (HIB), and human papillomavirus (HPV).
Key Features of the NIH Intramural Research Program

- **Stable funding** for productive, creative investigators
- **Scientific review** is rigorous, primarily retrospective
- **Specific Disease Orientation** for most ICs
- **Clinical Center**, a hospital dedicated solely to research
- **Can respond quickly** to public health issues
- **Effective technology transfer** program
The Intramural Environment- Pros and Cons

- Stable long-term resources for productive researchers
- Can concentrate on research endeavors
- Ability to conduct high-risk research
- Availability of the Clinical Center
- Ability to collaborate and interact scientifically both within NIH and with outside scientists

- Ethics regulations can restrict the acceptance of scientific awards, leadership positions in professional societies
- More difficult to supplement lab resources - Generally cannot apply for Federal grants (e.g., R01s; can now do so as MPI, co-investigator on some); few internal funding opportunities (e.g., RNAi facility proposals, Director’s Challenge, Bench-to-bedside proposals)
- Other governmental constraints (e.g. travel, physician salaries, government shutdown)
Intramural Scientists and Trainees

- 800 Senior Investigators
- 250 Tenure-track Investigators
- 33 Assistant Clinical Investigators
- 300 Staff Clinicians
- **1000 Staff Scientists**
- 3,800 post-doctoral fellows
- 500 graduate students
- 100 medical/dental students
- 600 post-baccalaureate trainees
- 1,000 summer students (high school, college, graduate and medical)
Trans-NIH Recruitment Initiatives

- **NIH Earl Stadtman Investigator recruitment**
  - Broad NIH call for recruitment of intramural tenure-track investigators (assistant professor equivalent)
  - Variety of basic and translational/clinical positions available (including biomed engineering); must have doctoral degree or equivalent and outstanding research record

- **Early Independent Investigator program**
  - Intramural component of the national NIH Director’s Early Independent Award Program
  - Designed to support recent doctoral graduates in independent positions (within 12 months of terminal degree); skip postdoc training
At the NIH, But Not a Tenure-Track Investigator

- Staff Scientist—has a doctoral degree; selected to support long-term research of Senior Investigator (tenured)
  - Do not receive independent resources, but may work independently (some are Facility Heads)
- Research Biologist, Chemist
  - Have Master’s, PhD; usually serve in scientific, technical support capacity
- Jobs@NIH--links to each Institute’s recruitment sites-- [http://www.jobs.nih.gov/vacancies/icrecruit.htm](http://www.jobs.nih.gov/vacancies/icrecruit.htm)
- NCI intramural, Center for Cancer Research-- [https://ccr.cancer.gov/positions](https://ccr.cancer.gov/positions)
But What if I Really Just Want to Have My Own Lab in Academia?

- NIH OITE [https://www.training.nih.gov/](https://www.training.nih.gov/)

- NIH Pathway to Independence Award (K99/R00)
  - Program designed to facilitate transition from mentored postdoctoral research position to independent tenure-track or equivalent faculty positions
  - Mentored component 1-2 years; independent R00 phase lasts up to 3 years
  - Open to applicants with PhD, MD; one of the few mechanisms applicable to engineers with prior bio research experience
Questions?
Thank you!

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