

Applying for research funding

ERIN HECHT

LAB MEETING 05/01/2024



Where does funding come from?

Government agencies

- NIH, NSF, DoD, etc.

Private foundations

- Wenner-Gren, Leakey Foundation, American Kennel Club, etc.

Private individual donors

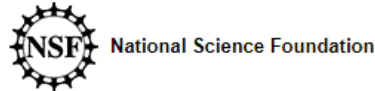
- I'm not that well-connected...

Internal university funds

- Startup
- Internal grants

**Understanding the Rules of Life: Emergent Networks (URoL:EN)
Predicting Transformation of Living Systems in Evolving Environments**

**PROGRAM SOLICITATION
NSF 21-560**



Full Proposal Deadline(s) (due by 5 p.m. submitter's local time):

May 10, 2021

IMPORTANT INFORMATION AND REVISION NOTES

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 20-1), which is effective for proposals submitted, or due, on or after June 1, 2020.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Understanding the Rules of Life: Emergent Networks (URoL:EN)
Predicting Transformation of Living Systems in Evolving Environments

Synopsis of Program:

In 2016, the National Science Foundation (NSF) unveiled a set of "Big Ideas," 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering (see https://www.nsf.gov/news/special_reports/big_ideas/index.jsp). The Big Ideas represent unique opportunities to position our Nation at the cutting edge of global science and engineering by bringing together diverse disciplinary perspectives to support convergence research. As such, when responding to this solicitation, even though proposals must be submitted to the Division of Emerging Frontiers in the Directorate for Biological Sciences (BIO/EF), once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors.

“Program solicitation” = instructions and info for a particular funding opportunity

How to you choose a funding opportunity?

Step 1: Internet search

The screenshot shows the NIH Grants & Funding website. The header includes the NIH logo and the text "GRANTS & FUNDING NIH Central Resource for Grants and Funding Information". A search bar is located in the top right corner. The main navigation menu includes "HOME", "ABOUT GRANTS", "FUNDING", "POLICY & COMPLIANCE", "NEWS & EVENTS", and "ABOUT OER". The "FUNDING" section is highlighted. Below the navigation, there is a "FUNDING" sub-section with a "Find Funding" button. A sidebar on the left lists various funding categories like "Contracts", "Research Training and Career Development", "Extramural Diversity", and "NIH Funding Strategies". A "RELATED RESOURCES" section on the right includes "Types of Grant Programs" and "Find and Understand Funding Opportunity Announcements".

<https://grants.nih.gov/funding/index.htm>

The screenshot shows the NSF Research Areas and Special Programs page. The "Research Areas" section lists various fields such as Biological Sciences, Geosciences, Computer and Information Science and Engineering, Integrative Activities, Crosscutting and NSF-wide, International Science and Engineering, Education and Human Resources, Mathematical and Physical Sciences, Engineering, Social, Behavioral and Economic Sciences, and Environmental Research and Education. The "Special Programs" section lists programs like Broadening Participation, For Undergraduate Students, For Graduate Students, For Veterans, For K-12 Educators, For Small Business Programs, and For Postdoctoral Fellows.

<https://www.nsf.gov/funding/>

How to you choose a funding opportunity?

Step 2: Look at what has been funded through that funding opportunity in the past. Is it similar to what you want to do?

National Science Foundation
WHERE DISCOVERIES BEGIN

SEARCH

HOME RESEARCH AREAS FUNDING AWARDS DOCUMENT LIBRARY NEWS ABOUT NSF

Simple Search Advanced Search Popular Searches Download Awards Send Comments Award Search Help

Advanced Search Results

Export up to 3,000 Awards: CSV XML Excel Text Email this Link Export All Results

Sort By: Relevance Results size: 30 per page Table List Page 1 of 3 Displaying 1 - 30 of 74

You Searched For:

Program URoL-Understanding the Rules of

Active Awards true

Start Date On or After
From 10/01/2018

Refined by

Refine Search

State

- Alabama(3)
- Arizona(3)
- California(13)
- Colorado(2)
- Connecticut(1)
- Show More ...

NSF Organization

- Direct For Social, Behav & Economic Scie(1)
- Direct For Biological Sciences(73)

Award Amount

- Less than or equal \$50,000(1)
- Between \$50,001 - \$100,000(2)
- Between \$100,001 - \$500,000(21)
- Between \$500,001 - \$1,000,000(24)
- More than \$1,000,000(26)

Award Instrument

- Standard Grant(72)
- Continuing Grant(2)

Collaborative Research: Booting up a Mirror Cell
Award Number:1935372; Principal Investigator:Neal Devaraj; Co-Principal Investigator;; Organization:University of California-San Diego;NSF Organization:EF Start Date:09/01/2019; Award Amount:\$2,814,014.00; Relevance:64.0;

URoL: Epigenetics 1: Influence of environmental change on the epigenome and phenotypic plasticity in purple sea urchins
Award Number:2021886; Principal Investigator:Marie Strader; Co-Principal Investigator:Katherine Buckley; Organization:Auburn University;NSF Organization:EF Start Date:07/15/2020; Award Amount:\$497,138.00; Relevance:64.0;

URoL: Epigenetics 2: Collaborative Research: Bumble bee cold tolerance across elevations - From epigenotype to phenotype across space, time, and levels of biological organization
Award Number:1921562; Principal Investigator:Michael Dillon; Co-Principal Investigator:James Strange, Franco Basile; Organization:University of Wyoming;NSF Organization:EF Start Date:10/15/2019; Award Amount:\$1,170,992.00; Relevance:64.0;

COLLABORATIVE RESEARCH: URoL : Epigenetics 2: Predicting phenotypic and eco-evolutionary consequences of environmental-energetic-epigenetic linkages
Award Number:1921402; Principal Investigator:Jose Eirin-Lopez; Co-Principal Investigator;; Organization:Florida International University;NSF Organization:EF Start Date:09/01/2019; Award Amount:\$629,339.00; Relevance:64.0;

URoL: Epigenetics 2: Connecting cell fate and epigenome drift through physical models of chromatin structure and dynamics
Award Number:2022182; Principal Investigator:Timothy Downing; Co-Principal Investigator:Andrew Spakowitz, Alistair Boettiger, Elizabeth Read; Organization:University of California-Irvine;NSF Organization:EF Start Date:07/15/2020; Award Amount:\$3,000,000.00; Relevance:64.0;

URoL: Epigenetics 2-Collaborative Research: Revealing how epigenetic inheritance governs the environmental challenge response with transformative 3D genomics and machine learning
Award Number:1921724; Principal Investigator:R. Keith Slotkin; Co-Principal Investigator:Blake Meyers, Sona Pandey, Malia Gehan, Christopher Topp; Organization:Donald Danforth Plant Science Center;NSF Organization:EF Start Date:08/01/2019; Award Amount:\$2,501,031.00; Relevance:64.0;

EF: Collaborative Research: MTM 2: Marine Invertebrate Microbiome Assembly, Diversification, and Coevolution
Award Number:2025009; Principal Investigator:Kent Hatch; Co-Principal Investigator;; Organization:Long Island University;NSF Organization:EF Start Date:01/01/2021; Award Amount:\$1,202,860.00; Relevance:64.0;

URoL: MTM 1: Chemistry of cnidarian symbiosis: microbiomes role in association, morphogenesis, and protection
Award Number:2025476; Principal Investigator:Sandra Loesgen; Co-Principal Investigator:Mark Martindale, Virginia Weis; Organization:University of Florida;NSF Organization:EF Start Date:10/01/2020; Award Amount:\$499,868.00; Relevance:64.0;

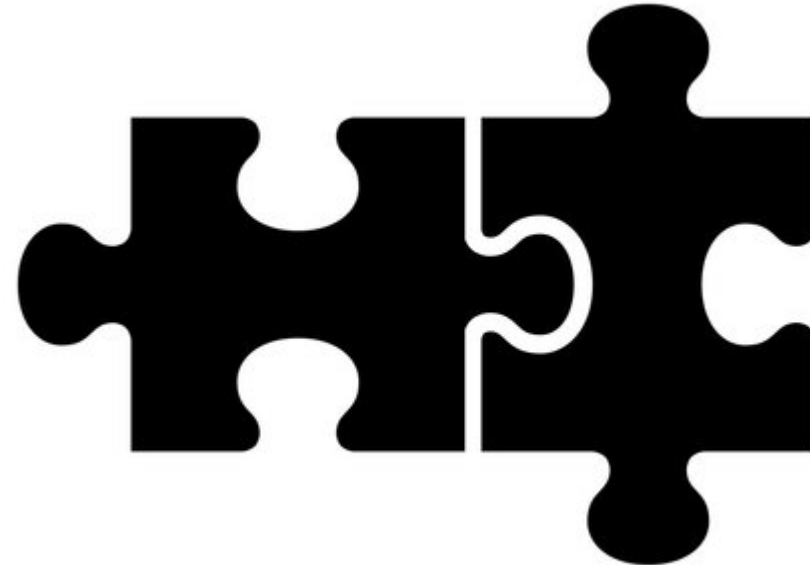
How to you choose a funding opportunity?

Step 3: Talk to program officers about “best fit”

...and, if you can:

- Success rates
- Average grant amount (if variable)
- Any “no go” topics

OK to ask them to refer you to a more relevant division/program!



What types of funding opportunities exist?

Trainee grants: Grad and postdoc fellowships

- NSF DDRIG/GRFP, NIH NRSA, Marie Curie, Fyssen

Transitional grants: Postdoc-to-faculty “career development”

- NIH K-series: <https://researchtraining.nih.gov/programs/career-development>

PI grants: Faculty*

- Some provide only research funds (often private foundations & internal university grants)
- Some provide research funds + salary (government agencies)
- May be collaborative (multi-lab); one person is the lead PI

* 2 side notes... Who can be a PI on a grant? Where does salary come from after grad school?

Who can apply as PI?



Most universities: tenure-track faculty or others with a (semi) “permanent” position



Some universities: also non-tenure-track faculty, postdocs, and/or grad students

→ Why do universities restrict PI rights?



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[About Awards](#)

How to Manage Your Award

[Grant General Conditions](#)

[Cooperative Agreement Conditions](#)

[Special Conditions](#)

[Federal Demonstration Partnership](#)

[Policy Office Website](#)



Award Abstract # 1457291

Impact of selection pressure for social behavior on canid brain evolution

NSF Org:	IOS Division Of Integrative Organismal Systems
Awardee:	
Initial Amendment Date:	July 22, 2015
Latest Amendment Date:	July 22, 2015
Award Number:	1457291
Award Instrument:	Standard Grant
Program Manager:	Edda Thiels IOS Division Of Integrative Organismal Systems BIO Direct For Biological Sciences
Start Date:	August 1, 2015
End Date:	July 31, 2019 (Estimated)
Total Intended Award Amount:	
Total Awarded Amount to Date:	\$532,390.00
Funds Obligated to Date:	
History of Investigator:	David Gutman (Principal Investigator) dgutman@emory.edu Todd Preuss (Co-Principal Investigator) Sharleen Sakai (Co-Principal Investigator) Erin Hecht (Co-Principal Investigator) Marc Kent (Co-Principal Investigator)
Awardee Sponsored Research Office:	Emory University 1599 Clifton Rd NE, 4th Floor Atlanta, GA US 30322-4250 (404)727-2503



Why does being listed as PI matter?



Who makes decisions about spending and research activities?



Who gets credit for “getting” the grant?



Who continues this line of research in the future?

Responsibilities of grant PI during submission



Coordinate all the paperwork – be on top of everything, know what is needed when, etc. (Jenna can help)



Coordinate among co-PI's / co-contributors – who is doing what, and when. Clear communication is key



Share final grant with all co-PI's / co-contributors, and get their approval before submission



(Just like being corresponding author on a manuscript!)

Responsibilities of grant PI after award

From the funding agency's perspective, unless it is a mentored grant (fellowship), the grant PI...

- makes hiring/firing decisions
- makes spending decisions, including how funds are allocated to people in the lab
- manages the budget, record-keeping, and total expenditures
- is responsible for all reporting and compliance (including IACUC and IRB)
- ...and is the party who can be held responsible, barred from future funding, and even fired, if any of those things go egregiously wrong

From the university's perspective, the head of the lab is actually the person who holds all of those responsibilities (for obvious reasons)

What goes into the grant?

“Route” to Office of
Sponsored
Programs (OSP) well
before due date
** Note: the university
(OSP) applies for the
grant (not you!)*

List of personnel: PI, co-PI’s, postdocs, staff, students, RA’s...

- Biosketches for all senior personnel (faculty and postdocs)
- Some non-senior personnel might be “to be hired” or “to be named”

Amounts and dates of current and pending support for all senior personnel

Budget and budget justification

Facilities, equipment, and other resources

Training plan for postdocs

Data management plan

Upload a few days
before due date

Project description (i.e., the actual science)

Project description

Aims (generally 1 page)

Introduction/background: Why is this an important question? What is known so far?

Preliminary data

Approach/methods: What will you actually do?

Impact/significance: What will this add to the field?

Future directions, potential problems & alternative approaches, etc

NSF: Broader impacts (education, outreach, applications)

References

What does the process look like?

Idealized version:



Decide what research
you want to do



Find funding
agencies that provide
money for that kind
of thing



Write an application



Receive reviews



Revise and resubmit



Get money

What does the process look like?

Reality is a bit different...



Decide what research you want to do



Find funding agencies that provide money for that kind of thing



Write an application



Receive reviews



Revise and resubmit



Get money

What research *can* you do? How do you make what you *want* to do fundable?

This might come first!

Or partially recycle an old one (LPT)

Sometimes grant not even scored

Most commonly: nope

THE MOST
COMMON
OUTCOME IS
FAILURE

EVEN IF YOUR GRANT IS
BRILLIANT

SOMETIMES, EVEN IF
THE REVIEWERS LOVE IT!

→ NOT GETTING
FUNDING IS A HUGE
PART OF GETTING
FUNDING

← **Tweet**



Andrew Iwaniuk
@AndrewIwaniuk

...

These get posted quite a bit, but I still think sharing a cv of failures with our students is important. Mine has plateaued a bit lately, but only due to a lack of motivation on my part. [#AcademicChatter](#)
[#AcademicTwitter](#)

Rejected grant applications

2018	Australian Research Council National Science Foundation
2017	Australian Research Council National Science Foundation Human Frontiers Science Program
2016	U.S. Department of Energy Australian Research Council
2015	Canada Foundation for Innovation Australian Research Council
2014	Human Frontiers Science Program Australian Research Council
2013	Australian Research Council
2010	Human Frontiers Science Program Smithsonian Institution-University of Maryland Grant National Science Foundation
2009	NSERC Northern Research Supplement
2008	National Science Foundation
2007	Alberta Heritage Fund for Medical Research Environment Canada
2006	Alberta Heritage Fund for Medical Research
2004	Alberta Heritage Fund for Medical Research
2001	Animal Behavior Society American Ornithologists' Union Frank M. Chapman Memorial Fund
1998	Alberta Heritage Fund for Medical Research

Faculty @ HEB (2019-2021)

NSF Integrative Organismal Systems – in prep → NSF CAREER

NSF Neural and Cognitive Systems - FRONTIERS

NSF Brain & Cognitive Systems - Science of Language and Augmented Intelligence (PI: Elizabeth Spelke)

NIH - Transformative Research Award (PI: Kelly Lambert)

Dean's Competitive Fund, Harvard University

Army Research Office, Department of Defense

NSF Neural and Cognitive Systems FOUNDATIONS (PI: Stout)

NSF IIBR (PI: Gutman)

Research scientist (~2015-2019)

NIH/VA award (PI: M. Pardue) - successful, but Harvard didn't let me keep it!

NSF NeuroNex

→ → NSF Neural & Cognitive Systems

Georgia State University Brains and Behavior Program Seed Grant

Emory University Research Committee Seed Grant

Human Frontiers Science Program

Post doc (~2012-2015)

The Wenner-Gren Foundation (PI: E. Hecht; Co-PI: T. Preuss)

→ → NSF Integrative Organismic Biology (successful after one resubmission)

Helen Hay Whitney Foundation postdoc fellowship

NIMH K99-R00 (application torpedoed *before* submission)

NIH Human-Animal Interaction

NIH RDoC R03

Leakey Foundation Post-PhD grant (x2)

Grad school (~2006-2012)

NIH NIMH R21 (two resubmissions)

NIH Director's DP5 Early Independence Award

NIMH/NIH Predoctoral NRSA F31 MH086179-03 (successful after 2 resubmissions)

Wenner Gren Foundation Dissertation Fieldwork Grant & Osmundsen Initiative Award

Leakey Foundation Predoctoral Fellowship

NSF Predoctoral Fellowship

In the past 3 years

Star-Friedman (Harvard Internal)

NSF EDGE

Simons Foundation

Mathers Foundation

Aramont (Harvard Internal)

Dean's Competitive Fund (Harvard internal)

Waltham Foundation

NSF NCS Foundations

Sloan Foundation

Milton Fund (Harvard Internal)

NSF CAREER

NSF Biological Anthropology

Dean's Competitive Fund (Harvard internal)

NICHD R34 (with Olivia)

NIH BICAN

Dean's Competitive Fund (Harvard internal)

NSF Major Research Instrumentation

Human Frontiers Science Program

APDT (with Julia)

ASPCA (with Julia)

NIGMS MIRA

**Hit rate: 16/33 grants, about 50%
(I think this is above average)**

**Failure is the most common outcome,
even when you are successful!**

Pointers for success?



Talk to the program officer

- They will often discuss a 1-pg summary with you
- Specific questions that are OK: Responsive to solicitation? Budget & duration? Factors that are an “automatic fail”?



Simple logical structure

- Lead readers down a “garden path.” Format accordingly
- Propose LESS, write LESS. K.I.S.S.
- Make sure any (non-noise) outcome is interpretable



Compelling graphics

- Schematic overview on aims page
- Methodological diagram for aims (samples, steps, etc)
- Make preliminary data look pretty and polished

+ use phrases from the solicitation in the application



Holy grail

All possible experimental outcomes fall into two or three mutually-exclusive categories

Each of those categories has distinct implications for answering the research question

You can explain this in a concise and straightforward way

And you can make it seem like the program solicitation was written with your proposal in mind



Things to avoid

Confusing, overwhelming, or otherwise ticking off the reader

- Remember, your grant may be one of a dozen, which they are reading while a screaming 2-year-old is dumping orange juice on the dog and their department chair is asking for a favor and their own grant has just been rejected and...

Interdependent aims

- There should be no “domino effect” possible if one aspect of the plan derails

Designing experiments to show X

- What if X isn't actually true? Will you have negative results? The whole thing is now a wash?

Exploratory research (so I've been warned?)

- I do propose exploratory research in my grants. But I frame it around a hypothesis, and state that I'm collecting the data in a way that will enable data-driven, unbiased analysis.

How does the review process work?

NIH: Center for Scientific Review (external agency) organizes review groups (study panels)

- You may be able to submit to a specific study panel (you can discuss this with NIH people)
- 2-3 members of the study panel read your application closely
- 1 member is the “lead reviewer” who organizes discussion
- All members, including others beyond these 3, vote on a score
- Funding is assigned in large part based on this score
- Some investigators may be prioritized

NSF (& private foundations): reviewers are drawn from the general academic field

- You can specify preferred/non-preferred reviewers (devote actual thought to this)
- For NSF, you must also supply a list of people for whom reviewing your grant would be a COI
- 2-3 reviewers supply in-depth reviews
- NSF program officers have considerable discretion on funding decisions. Military, even more.

Receiving your reviews

I read reviews at the end of the day – preferably the end of the week... then walk away

Revision strategy: address everything so thoroughly that it's difficult for them to justify not awarding.

The Stages of Revision



denial



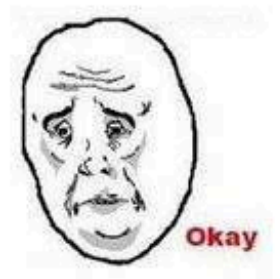
anger



bargaining



depression



acceptance

Great! You're funded. Now what?

Wait... about 6 months... before the money actually arrives

Progress reports: annual updates on research activities and output

Final report: what was accomplished in the lifetime of the grant (trainees, papers, etc)

No-cost extension: spend existing money after project period has ended

Think about the next grant before this one runs out

Where does the money actually go?

#1: to the university

- “Indirect costs” = facilities, computing, administrators, etc.
- Rate is negotiated every few years between university & federal government (Harvard FAS: 69%)
- Budget accordingly
- If your grant doesn't include indirect costs, you have to pay the university from other funds!

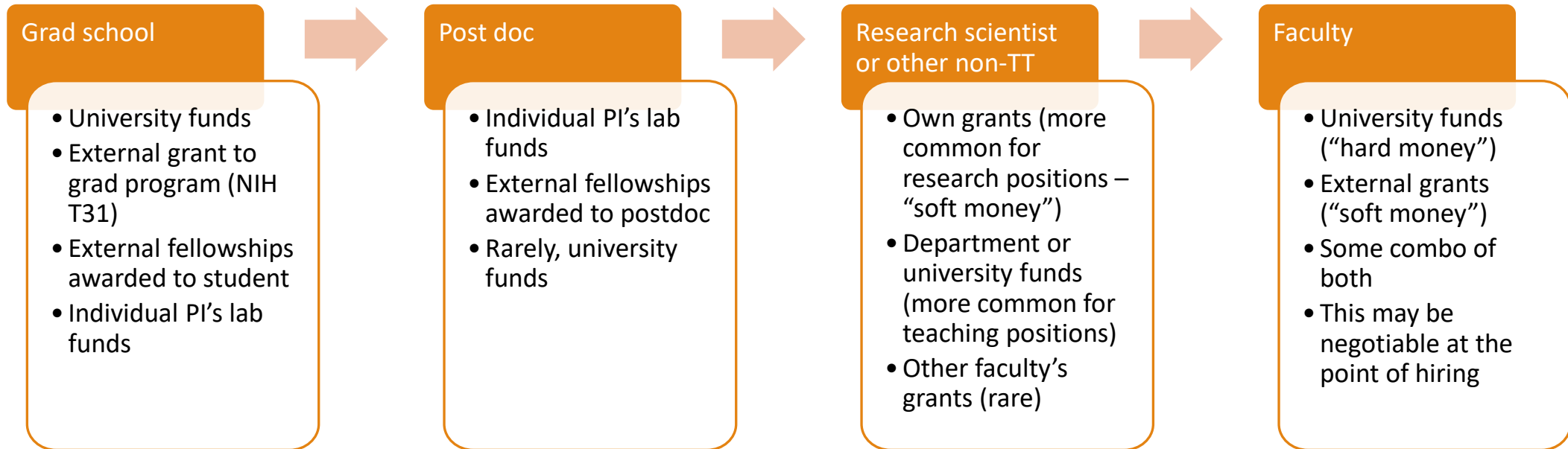
#2: salaries

- For hard-money positions (like me), can be one or more optional “summer months” of salary
 - For soft-money positions, you HAVE to cover some portion of your salary through grants
- For postdocs, other staff, etc., can be some % of your “full-time employment” (FTE)
- “Fringe” = percent of salary on top of actual pay that goes to health insurance and other benefits (for faculty, 23.6%)

#3: research costs

- Samples, scans, supplies, core fees, travel, publication fees, etc.

Where does salary come from?





Questions?
Things I missed?

Other thoughts,
questions, or insights?
