



Astrophysics



Named Fellowships Discussion

**Thanks to Dawn Gelino, Paul Green, Claus Leitherer,
Charles Beichman, Belinda Wilkes, Neill Reid**

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Review of Proposed Changes to NASA Named Fellowships (NNF)

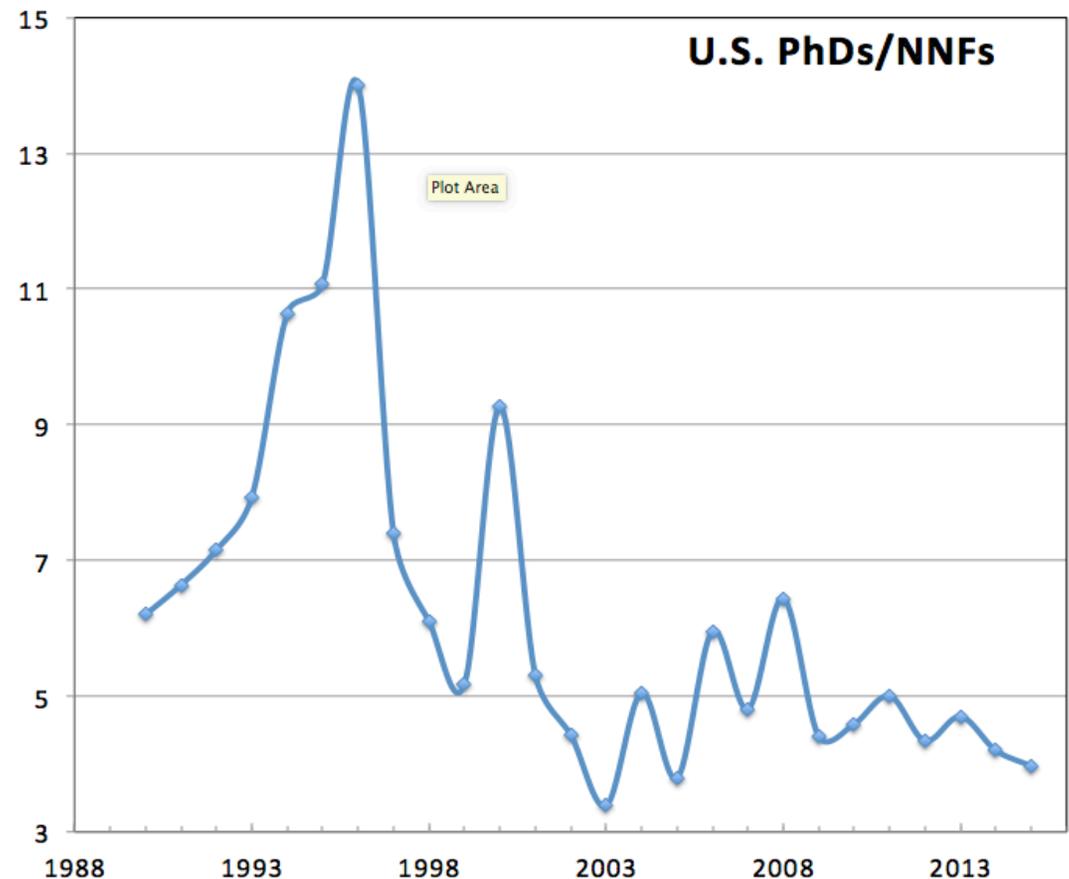


Proposal: Reallocate a fraction of Named Fellowship \$\$ to R&A

Why: To restore balance of \$\$ between research grants & NNF program which has changed from 10:1 to 6:1 over last decade

With the proposed reduction, it is not NASA's intent to alter the current balance or the mix of science topics within the NNF.

Note that while pressure on grants programs has steadily increased, the US PhDs / NNF ratio has *decreased* from 6:1 to 4:1.



Background



2014-2016 fellows: 106 fellows

Selected: Hubble (48 fellows), Einstein (39), Sagan (19)

Applications: Hubble (819), Einstein (496), Sagan (256).

Current Fellows Compensation:

Salary: \$67,500 per annum + benefits/fringe*

Research budget: \$16,000 per annum

* NASA pays for health insurance but not for retirement.

A fellow costs NASA ~\$110-130K per year.

Note: Fellows can be employees of the host institution.

A typical “grant” postdoc costs: ~\$100-\$110K (anecdotal)

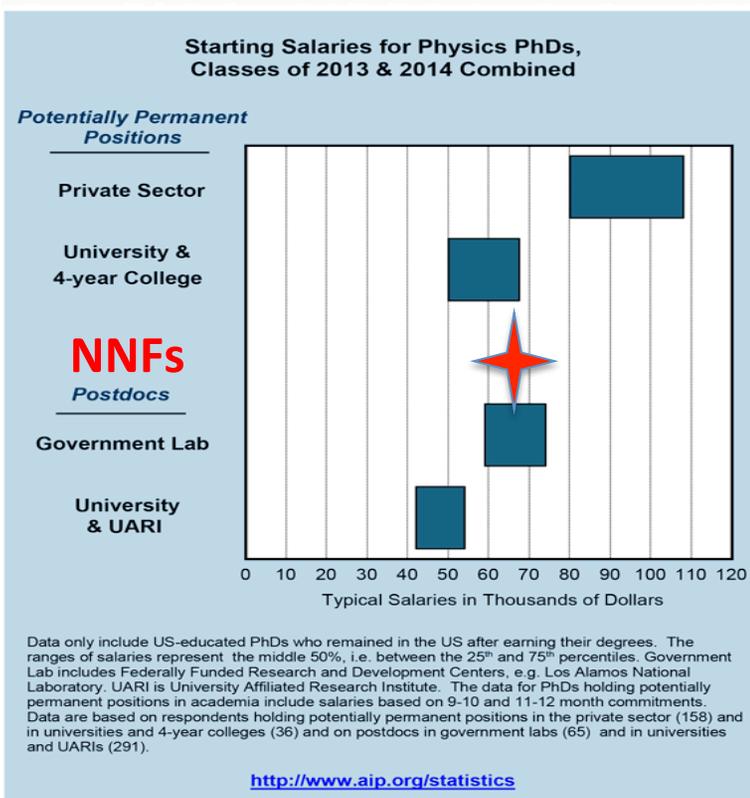
Here we assume a salary of 52K, an overhead rate ~60%, a fringe/benefits rate of 30% +research travel /computing costs of ~5K – this would be ~\$110K.

Your Seven Questions - I



The Astrophysics subcommittee asked 7 questions (see also back up slides here)

Q1. How are the salaries and research budget amounts set / how do they compare to other fellowships / grant-funded pdocs?



- Based on a market study done by STScI. Current salary based on mean / mode.
- Consistent with salaries of physics PhDs in govt. labs in AIP survey.

* 15 institutions and 25 fellowships surveyed (half at Caltech or CfA). Sagan + Einstein in pool.

Your Seven Questions - II



Q2. What is the breakdown of NNF career path / how does it compare to a control pool?

- NNF alumni remain in astronomy at 90% or higher. Comparison to 30-year averages from U. Maryland and Caltech show comparable but slightly lower numbers for their PhD alumni (~85%).

Q3. How has number of named fellowships tracked the number of US PhDs (or some other cohort?) over time?

- Number of NNFs has increased significantly relative to the US PhD production: US astrophysics PhD to NNF ratio has declined from 6 to 4 from 1990-2016.
 - Pool of foreign physics /astro PhDs not tracked
 - There is an increase in prize-fellowships but numbers not tracked.

Your Seven Questions - III



Q4. What is the “Over-subscription rate” / what fraction of deserving candidates are not selected?

- NNF leads say their panels feel that they have twice as many deserving candidates as fellowships.

Q5. What fraction of applicants apply for multiple fellowships?

- **70+% overlap between Hubble and Sagan applicants and Hubble and Einstein applicants**

Q6. How many individuals have held more than one NNF?

- 8 fellows (out of 558) have held both the Hubble + Einstein
- 1 fellow has held Hubble + Sagan
- ~16 Hubble fellows have been in the exoplanet program theme

Your Seven Questions - IV

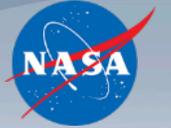


Q7. What is the distribution of PhD/Host institutions for NNF and how does that compare to the R&A program?

Distribution of R&A awards more widespread than the NNFs

NNF program	Hubble	Einstein	Sagan
Total # of awards	358	153	47
Uniq PhD Institutions	92	58	30
Uniq Host Institutions	56	36	23
> 50% → # Hosts	7	5	6
R&A ('10-'16)	ADAP	ATP	APRA
Total # of awards	477	212	282
Uniq Institutions	119	73	70
> 50% → # institutions	18	13	11
Universities fraction	391 / 82%	189 / 89%	177 / 63%

Proposed Solution (modified)



Given the large overlap in applicants, combine the fellowships to a single review

- Maintain program balance with selection of ~8 fellows in each theme
- Fellows named to maintain their connection to the program office themes.
- Ensure that NExSci, CXC and STSci all play an integral role in organizing the review and the selection of fellows + workshops / symposia.

Proposed Solution (modified)



Would re-balance ~\$6M (2M in Yr 1, 4M - Yr2, 6M - Yr 3)

R&A ('10-'16)	ATP	ADAP	APRA
# of awards	212	477	282
Typical length	3 years	2--3 years	3—5 years
Average cumulative award amount	~\$500K	~\$300K	~\$1M*
<i>*Includes sub-orbitals which are ~\$2—4M each</i>			
R&A	ATP	ADAP	APRA
Average Program Budget ('14-16)	~\$12M	~\$17M	~\$48M

Adding ~\$6M to one or more of these programs will have a significant positive impact on the selection rates.



Backup Slides



Q1. How are the salaries and research budget amounts set and how do they compare with other prize fellowships and regular grant-funded postdocs?

2015 NASA Named Fellowship salary: \$67,500 per annum + \$16,000 per annum in research funds.

The NNFs have set their salaries based on the Fellowship Salaries Document provided by STScI – they surveyed a number of institutions and fellowships as follows:



Participants	Fellowship
AIP	AIP Congressional Science Fellowship
	AIP State Department Fellowship
Caltech	Postdoctoral Prize Fellowship in Experimental Physics or Astrophysics
	Burke Fellows in Theoretical Physics and Astrophysics
	Sagan Postdoctoral Fellowship
Carnegie Institute	Carnegie Fellowship
	Carnegie-Princeton Fellowship
Harvard- CXC	Einstein Fellowship
Harvard	Harvard Society of Fellows
Harvard-CfA	Black Hole Initiative Postdoctoral Fellowship
	ITAMP Postdoctoral Fellowship
	Harvard Future Faculty Leaders Pdoc Fellowship
	CfA Fellowship
	Clay Fellowship
	SMA Postdoctoral Fellowships
	ITC Postdoctoral Fellowship



Participants	Fellowship
Lawrence Livermore National Laboratory	Lawrence Fellowship Program
National Radio Astronomy Observatory	Jansky Fellowship Program
National Science Foundation	NSF Astronomy and Astrophysics Postdoctoral Fellowship
SLAC National Accelerator Laboratory	Panofsky Fellowship
University of Arizona	Bok Postdoctoral Fellowship
University of California, Berkley	Miller Fellowship
UC, Santa Cruz	Morrison Postdoctoral Fellowship
University of Chicago	Grainger Postdoctoral Fellowship in Exp. Physics
University of Texas at Austin	W.J. McDonald Postdoctoral Fellowship

- **15 Institutions Surveyed**
- **25 fellowships surveyed (half at Caltech or CfA)**
 - Sagan +Einstein in pool

STScl Survey Conclusion



- **Range: \$58,800 to \$106,664**
- **Mean/Average: \$69,172**
- **Median: \$67,500**
- **Mode: \$67,500**

Additionally, in some cases, separate additional funds were designated to support costs of research, including travel. A number of organizations also provide basic benefits like health insurance coverage. We had limited information on year over year growth of compensation stipends, but growth appears to be small on average - 1-2%.



Starting Salaries for Physics PhDs, Classes of 2013 & 2014 Combined

Potentially Permanent Positions

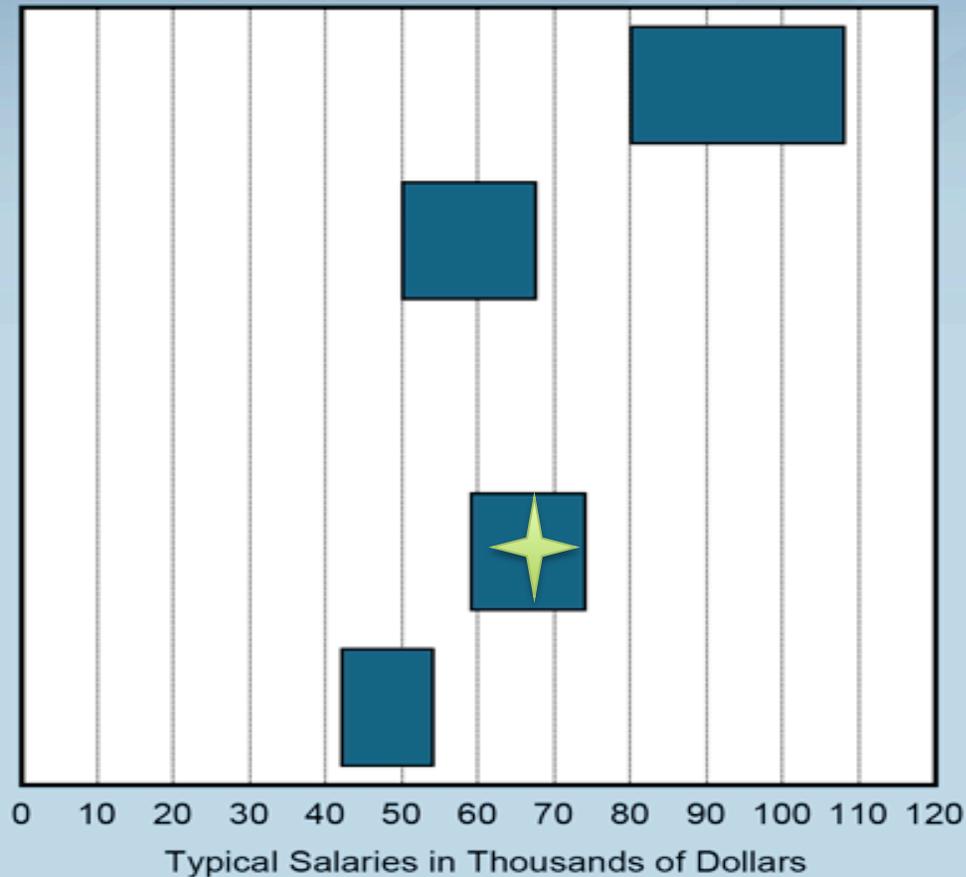
Private Sector

University &
4-year College

Postdocs

Government Lab

University
& UARI



Data only include US-educated PhDs who remained in the US after earning their degrees. The ranges of salaries represent the middle 50%, i.e. between the 25th and 75th percentiles. Government Lab includes Federally Funded Research and Development Centers, e.g. Los Alamos National Laboratory. UARI is University Affiliated Research Institute. The data for PhDs holding potentially permanent positions in academia include salaries based on 9-10 and 11-12 month commitments. Data are based on respondents holding potentially permanent positions in the private sector (158) and in universities and 4-year colleges (36) and on postdocs in government labs (65) and in universities and UARIs (291).

AIP Stats

US-educated
PhDs who
remained in US
afterwards

Sample/box: 158,
36, 65, 291

Salary for
Astrophysics
Bachelors degrees
at colleges /
universities
(28-45K), and in
the Private Sector
(~38--57K).



Q2. What is the breakdown of career paths of former fellows compared with some control pool?

Hubble ('90-): 307, 270 in astro (90%), 6% left field.
Einstein ('97-): 104, 101 in astro (97%), 3% left field.
Sagan ('09-): 40, 47 in astro (94%), 4% left field

Comparison to Universities:

University of Maryland

- **Ph.D.s awarded (1986-1999): 56, 54 in astro (96.4%)**
- **Ph.D.s awarded (1966-1999): 141, 117 in astro (83%)**

Caltech

- **PhDs over last 30 years: 83-86% in astronomy**



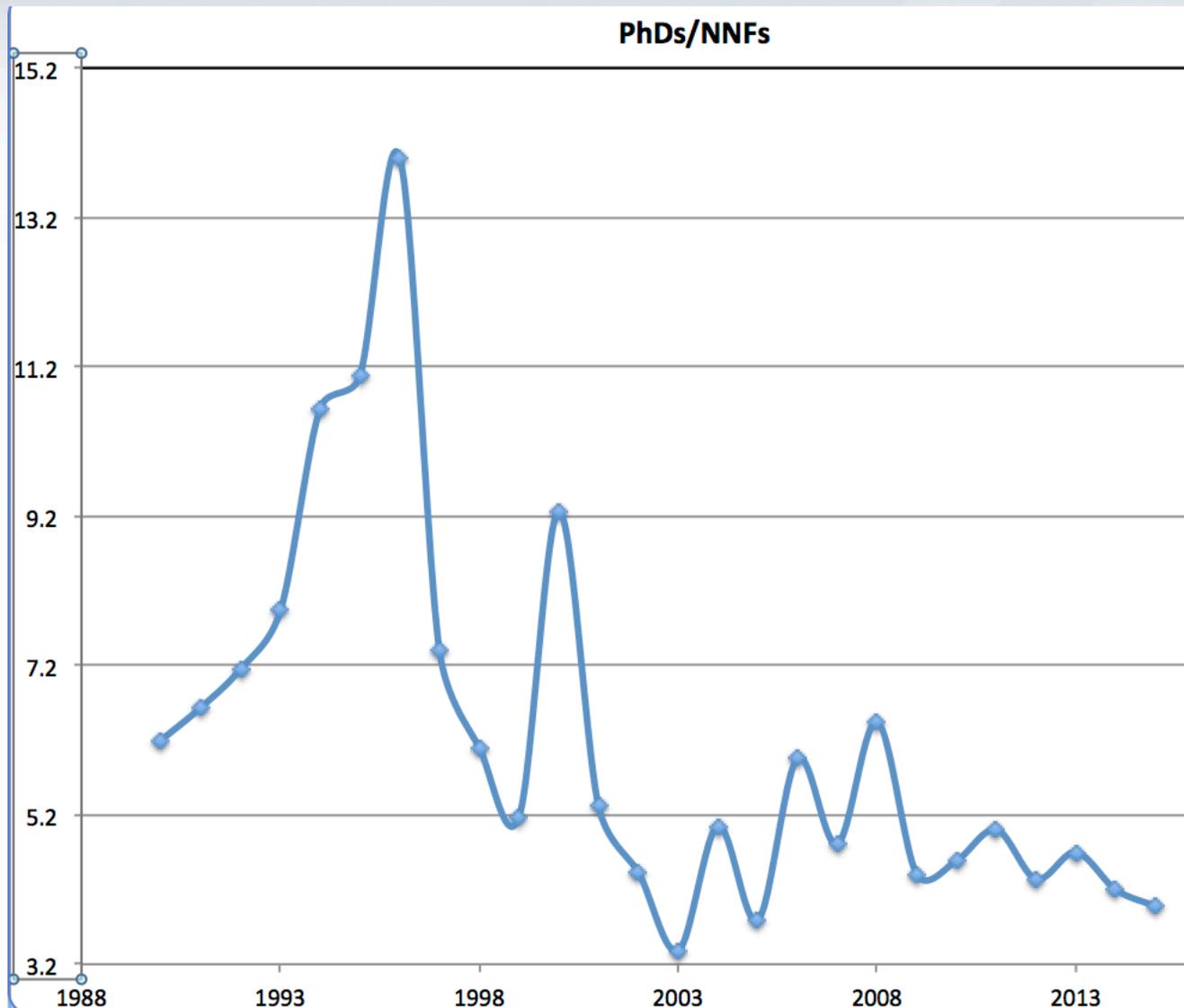
Q2. What is the breakdown of career paths of former fellows compared with some control pool?

The NNF program alumni are successful at obtaining permanent employment in astronomy (~90%)

This is not significantly higher than the two programs we could find statistics on (Over a 30 year time there is a ~85+ % retention in astronomy. In a shorter 14 year recent period at Maryland, their website shows a 96% retention rate).



Q3. How has number of named fellowships tracked the number of US Phds (or some other cohort?) over time?



This past year was the 3rd lowest ratio US PhDs to NNFs.

US PhDs/NNF ratio decreased by 33% from 6:1 to 4:1.



Q4. Do we have some way of determining an 'over-subscription rate' -- i.e., what fraction of applications are deemed deserving but not able to be selected?

NNF leads say their panels feel that they have twice as many deserving candidates as fellowships

Program Year	Hubble Offers / Applications	Einstein Offers / Applications	Sagan Offers / Applications
2016	15 / 282	12 / 190	6 / 89
2015	17 / 265	14 / 185	6 / 85
2014	16 / 272	12 / 148	7 / 82



Q5. What fraction of applicants apply for multiple named fellows?

- **~70% overlap between Hubble and Sagan applicants and Hubble and Einstein applicants**
- **No overlap between Sagan and Einstein applicants.**

Year	Hubble Applicants	Sagan Applicants	Common Applicants	Percentage of Hubble	Percentage of Sagan
2012	278	69	45	16.2	65.2
2013	283	79	46	16.3	58.2
2014	282	82	59	20.9	73.0
2015	265	85	63	23.8	74.1
2016	272	89	68	25.0	76.4



Q5. What fraction of applicants apply for multiple named fellows?

Year	Hubble Applicants	Einstein Applicants	Common Applicants	Percentage of Hubble	Percentage of Einstein
2013	283	190	106	37.5	55.8
2014	282	185	131	16.5	70.8
2015	265	148	101	38.1	68.2
2016	272	163	117	43.0	71.8

There is significant overlap in applications – most Sagan and Einstein applicants also apply for the Hubble.

Q6. How many individuals have held more than one named fellowship (i.e., an Einstein and then a Hubble)?



Name	Einstein/ Chandra /Fermi	Hubble
Reines	2011	2014
Neilsen	2012	2014
McQuinn	2009	2012
Lopez	2011	2014
Levesque	2010	2013
Gallo	2005	2008
De Mink	2013	2010
Barger*	1999	1999

8 fellows have held both the Hubble and Einstein fellowships

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De Mink	2013	2010
Barger*	1999	1999

8 fellows have held both the Hubble + Einstein

Only 1 fellow has held Hubble + Sagan

16 Hubble fellows have been in the exoplanet program theme



Q7. What is the distribution of phd institutions and host institutions for the named fellowship holders, and how does this compare to the institutions for which general RA& funding is awarded?

HUBBLE

Total number of Hubble fellows (1990-2016): 358 total fellows.

Total number of unique PhD institutions: 92

Total number of unique host institutions: 56

**> 50% of all fellows (188 / 358 fellows) went to 7 institutions:
Princeton / IAS (38), Harvard-CfA (33), Carnegie (30), Caltech (25), UC-Berkeley (23), UCSC (20), JHU / STScI (19).**



A7. EINSTEIN STATS

EINSTEIN

Total number of Einstein/Fermi/Chandra (1998-2016): 153 total fellows* (1 at large - not included in these statistics).

Total number of unique PhD institutions: 58

Total number of unique host institutions: 36

**> 50% of all fellows (77 / 152 fellows) went to 5 institutions:
Harvard-CfA (23), Princeton / IAS (16), UC-Berkeley (15), Stanford /
SLAC (12), Caltech (11).**



A7. SAGAN STATS

SAGAN

Total number of Sagan fellows (2009-2016): 47 total fellows

Total number of unique PhD institutions: 30 institutions

Total number of unique host institutions: 23

> 50% of all fellows (25 / 47 fellows) went to 6 institutions: Harvard-CfA (7), MIT (4), Arizona (4), UCSC (4), Caltech (3), UC-Berkeley (3)



A6. NASA Astrophysics Theory STATS

- Time range 2010-2016.
- Total number of awards: 212
- Institutional Balance: 73 Unique Institutions (64 Universities, 2 NASA - GSFC, JPL, 4 Government labs, 3 Private/Non-profits)
- Of the 212 awards, 189 went to Universities, 12 to NASA Centers, 7 to Government labs and 4 to Private / Non-Profits.
- > 50% of all awards (109 /212) awards went to **13** Institutions: Harvard-CfA, UC-Berkeley (12), Columbia, Colorado (11), Cornell, Princeton (10), NASA-GSFC (8), UCSC , Maryland, Michigan (7), Illinois (6), ASU, Caltech (4)
- ***89% of all awards went to Universities.***
- PI Balance: 172 Unique PIs.
- The maximum number of awards (3) to any one PI (6 such PIs).
- ***50% (106 /212) of all awards went to 66 PIs.***



A6. NASA Astrophysics Data Analysis

- Time range 2010-2016.
- Total number of awards: 477
- Institutional Balance: 119 Unique Institutions (101 Universities, 8 Private / Non-profit, 6 Government, 4 NASA Centers)
- Of the 477 awards, 391 (82%) went to Universities, 49 (10.3%) to NASA Centers, 10 (2.1%) to Government labs and 27 (5.7%) to Private / Non-profit centers.
- > 50% of all awards (244 /477) awards went to 18 Institutions: Harvard-CfA (36), JHU/STScI, NASA GSFC (24), Maryland (19), JPL, Penn State (17), Arizona (13), UC Berkeley, UMass-Amherst (11), Caltech, Colorado (9), Eureka Scientific, Rochester, UC-Irvine, Hawaii, UMBC (8), Carnegie, Ames (7).
- **82% of all awards went to Universities.**
- PI Balance: 355 Unique PIs
- The maximum number of awards (5) to any one PI (2 such PIs).
- **50% (239 / 477) of all awards went to 117 individual PIs**



A6. NASA Astrophysics R&A (APRA) STATS

- **Time range 2010-2016 (+1 award made so far for 2017).**
- **Total number of awards: 283 (including 32 NESSF awards which are 11.3% of the awards):** This means that from 2010-2016, **250** awards were made. However in all of the analysis in the excel sheet and below, we treat the NESSF awards as regular APRA awards for the statistics.
- **Total Number of Awards (2010-2016 + 1 in 2017): 283**
- **Institutional Balance: 70 Unique Institutions (52 Universities, 8 NASA Centers (includes JPL), 7 Government Labs, 3 Private / Non-Profits) received the awards.**
- **Of the 283 awards, 177 went to Universities, 78 to NASA Centers, 25 to Government labs and 3 to Private / Non-Profits.**
- ***63% of all awards went to Universities.***
Consistent with ~2/3rd of the awards going to the community and ~1/3rd to the NASA Centers /Govt labs.



A6. NASA Astrophysics R&A (APRA) STATS

- **> 50% of all awards (145 / 283 awards) went to 11 institutions: NASA GSFC (40), JPL (24), Caltech (15), MIT (11), Columbia (10), U. Maryland (9), U. Colorado (8), University of California (7, generically labeled), UC-Berkeley (7), Washington U. (7).**
- **PI Balance:**
- **> 50% of all awards (145 / 283 awards) went to 54 different PIs**
- **Only 9 PIs had more than 4 awards and all of them are at Universities or a non-NASA lab:**

Mazin, UC-Santa Barbara (6)

Gorham, U. Hawaii (5 of which 2 are NESSFs)

Beiersdorfer, LLBL (4)

Irwin, NIST / Stanford (4)

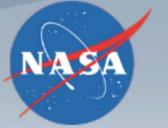
Martin, Caltech (4)

Mueller, U. Florida (4 of which 1 is NESSF)

Schattenburg, MIT, (4)

Schiminovich, Columbia (4 of which 1 is NESSF)

A7. Distribution of NNF vs R&A awards



Overall the distribution of awards is wider i.e., more different PIs and institutions with the R&A programs than the NNF programs.