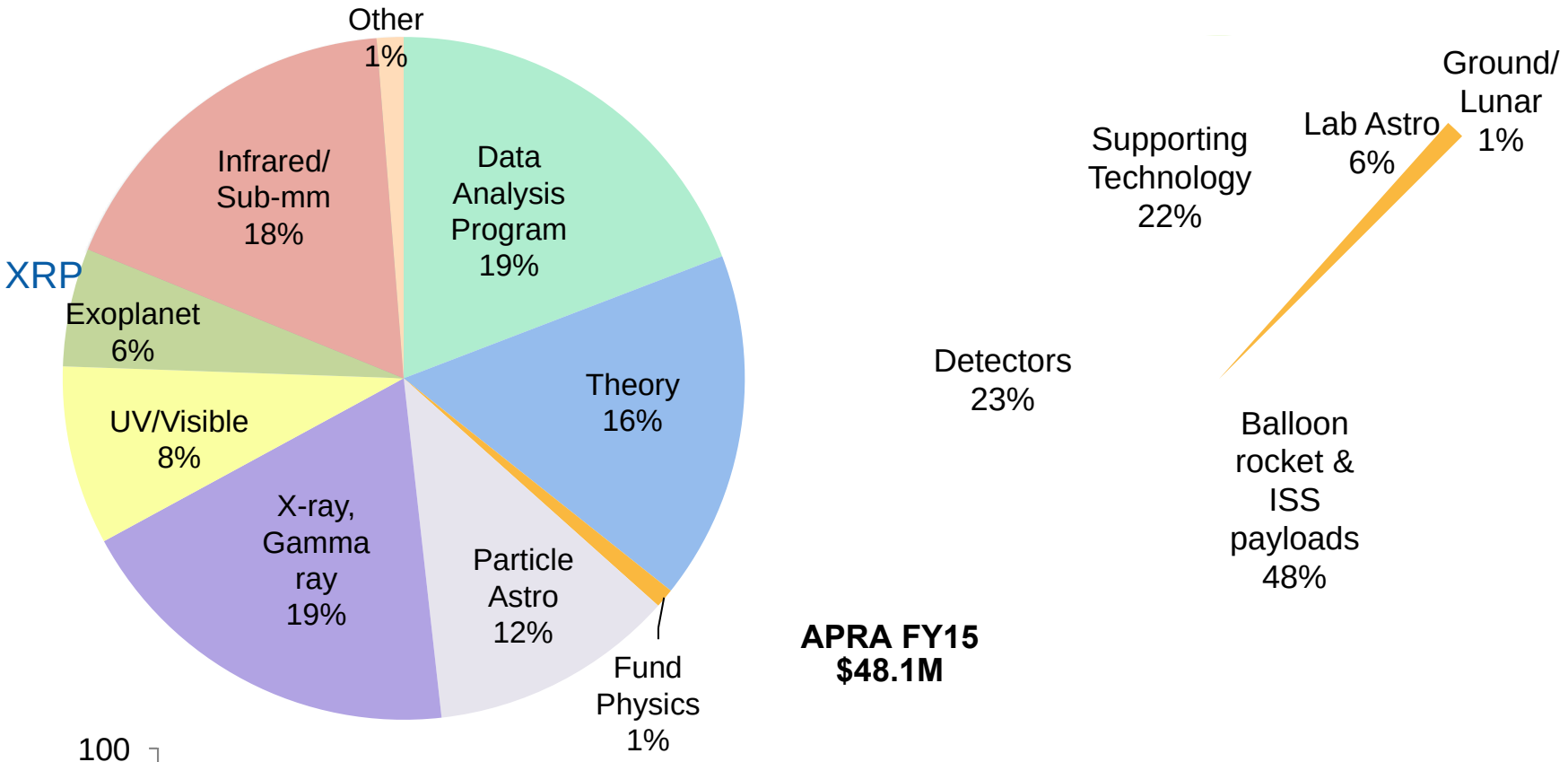
NASA Earth and Space Science Fellowships: Supporting Astrophysics Graduate Students

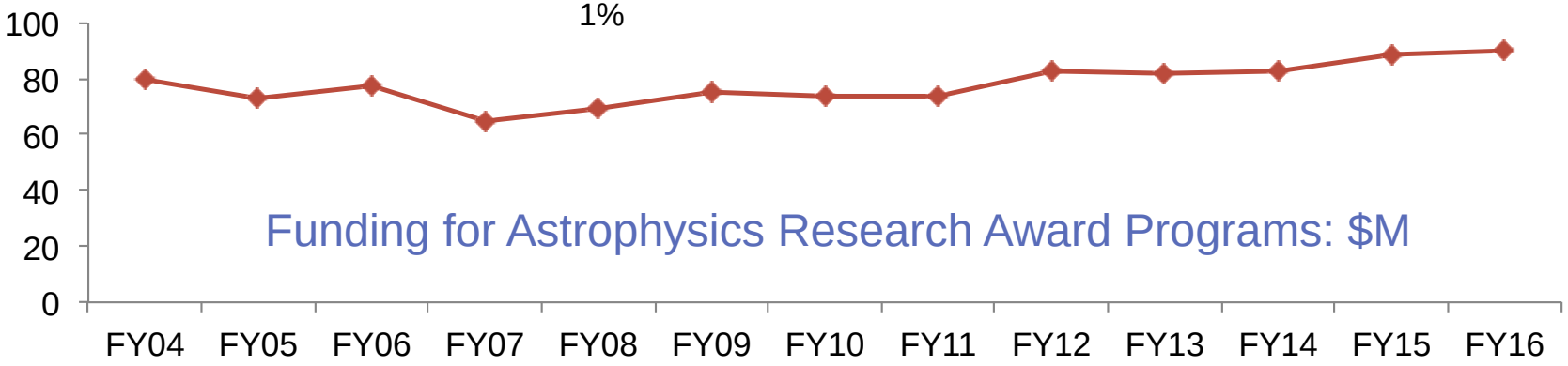
NASA Advisory Council
Astrophysics Subcommittee

16 March 2016

Linda Sparke
Research Program Manager
Astrophysics Division

Astrophysics Research Program FY15





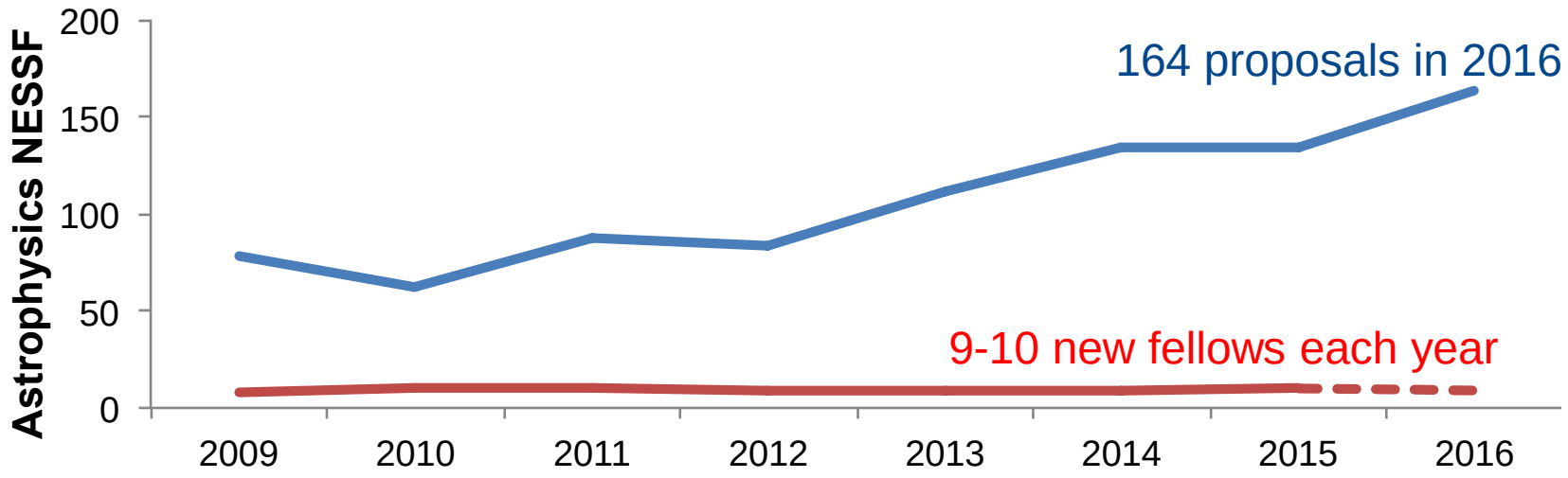
Astrophysics NESSF Fellowships

At its October meeting, this committee asked for a report on the NESSF program in Astrophysics, expressing concern at the low selection rate, and at students who submit repeat proposals and are funded only when almost finished. A specific request was to discuss the consequences of funding 20 fellows per year.

The purpose of the NESSF is to ensure continued training of a highly qualified workforce in disciplines needed to achieve NASA's scientific goals.

The fellowship is open to all students pursuing Masters or Doctoral degrees at accredited US universities. Astrophysics investigations should explicitly support past, present, or future NASA astrophysics missions.

Over 2008-15, Astrophysics made 75 NESSF awards, all to PhD students.



Astrophysics NESSF Fellows 2007-2015

total	men	women	% women	
75	50	25	33%	All fellowships
23	15	8	35%	Technology/payloads

26	at private schools	34	at Western institutions
49	at public schools	22	at Eastern institutions
		19	at other institutions

Where are they now? Fellows 2007-2013

Still in graduate school	32
Total who completed PhD	**43**
Postdoc	23
Research faculty	6
Software/data	8
Engineer, army, policy, teacher	4
Degree completed, then ??	2

Which Institutions Host Fellows?

Fellows/Univ	1	2	3	4	5	6
	Arizona State U					
	Case Western Reserve				U Illinois Urbana	
	Johns Hopkins				U Illinois Urbana	
	Louisiana State U		Caltech		U Illinois Urbana	
	MIT		Caltech		U Illinois Urbana	
	Northwestern U		Caltech		U Illinois Urbana	
	Ohio State U		Cornell U		U Colorado	
	Rochester Inst Tech		Cornell U		U Colorado	
	U Michigan		Cornell U		U Colorado	
	U Pennsylvania		Harvard U		U Colorado	
	U Washington		Harvard U		U Colorado	
	U Wisconsin-Madison		Harvard U		Princeton U	
	UC Davis		U Arizona		Princeton U	
	UC Los Angeles		U Arizona		Princeton U	
	UC Santa Cruz		U Arizona		Princeton U	
	U Chicago	Penn State U	U Texas at Austin		Princeton U	U Maryland
	U Florida	Penn State U	U Texas at Austin		Columbia U	U Maryland
technology	U Hawaii	U Iowa	U Texas at Au	U Virginia	Columbia U	U Maryland
or payload	U Wyoming	U Iowa	UC Berkeley	U Virginia	Columbia U	U Maryland
red = woman	Vanderbilt	U Washingtor	UC Berkeley	U Virginia	Columbia U	U Maryland
blue = man	Yale U	U Washingtor	UC Berkeley	U Virginia	Columbia U	U Maryland
# Universities	21	3	6	1	4	1

Increasing Selection Rates for NESSF

What can be done to increase the selection rate for Astrophysics NESSF proposals?

1) Increase funding for the program:

We now spend roughly $30,000 * 24 = $0.72M/year on NESSF awards.

Cost of selecting 20 new fellows each year: $30,000 * 60 = $1.8M/year

The additional $1M/year is equivalent to

-- two awards in Theory and Computational Astrophysics Networks Program, or

-- one fewer rocket payload proposal every 3 years, or

-- one fewer balloon payload or CubeSat proposal every 4 years, or

-- cost of Roman Technology Fellows program (~$1M/year)

2) Restrict the years in which students can apply to the program:

The STMD graduate fellowships require applicants to apply before completing 3 years of graduate education (with allowance for interrupted study).

A similar restriction for NESSF would eliminate repeat proposals late in their graduate studies from students who were not successful in earlier years.

Graduate Fellowships for Astrophysics

	Year of graduate study to apply	Max duration	Stipend and other allowances	Number awarded
STMD: NASA Space Tech Research Fellowship	1 2 3	4 years	$36k/year stipend, $18k for institution, $20k for mentor and visiting technologist	4-5/year for Astrophysics topics
NSF: Grad Student Research Fellowships	0 1 2	3 years	$32k/year stipend, $12k for institution	2000 across NSF; 1 in 7 success
SMD: NASA Earth & Space Science Fellowship	1 or later	3 years	$24k stipend, $6k for institution	Astrophysics: 9/year, <1 in 10 success

How Helpful Are Graduate Fellowships?

NSF funded a 2014 study of the 1994-2011 Graduate Student Research Fellowship recipients, against a control group of students who just missed being selected, and were given ‘honorable mentions’.

Compared with ‘honorable mentions’, a larger fraction of fellows finished a PhD within 10 years; but fellows did not complete their degrees any faster.

After graduation, there was a ‘small to medium’ impact with fellows presenting more conference papers, publishing more journal papers, and being awarded more grants than ‘honorable mentions’.

Fellows were more likely than the average STEM PhD to be employed in higher education after they graduated.

Women, Hispanics and African-Americans were more likely to be picked for fellowships from the ‘maybe’ pool than in the first round, but were a larger fraction of fellows than of ‘honorable mentions’.

In physical science and engineering, half of the 2009-11 NSF GSRP cohort felt that other fellowships were more desirable, primarily because they paid better and because the $12k did not cover full tuition.

Astrophysics Research Program backups