

AAAC Proposal Pressures Study Group

Interim Report Summary

*Priscilla Cushman
University of Minnesota
October 23, 2015
NASA APS Meeting*

AAAC Proposal Pressures Study Group

Established Summer 2014

Gather relevant proposal and demographic data from both the agencies and the community in order to understand how the funding environment over the last 10 years has affected researchers and projects. We will compare funding models across agencies and determine appropriate metrics for evaluating success. This will allow us to provide data-driven projections of the impact of such trends in the future, as well as that of any proposed solutions.

Members

Priscilla Cushman (AAAC Chair) Minnesota.
Jim Buckley (AAAC) Washington U.
Todd Hoeksema (AAS CAPP) Stanford
Chryssa Kouveliotou (APS) GWU
James Lowenthal (AAS CAPP) Smith College
Angela Olinto (AAAC) Chicago
Brad Peterson (NASA NAC) Ohio State
Keivan Stassun (APS) Vanderbilt University

Agency Contact Persons

NSF/AST: Jim Ulvestad, (Jim Neff)
NSF/PHY PA: Jim Whitmore, Jean Cottam
NASA/APD: Paul Hertz, Hashima Hasan,
Linda Sparke (Dan Evans)
DOE/HEP Cosmic Frontier: Kathy Turner
(Michael Cooke)
NASA/HPD: Arik Posner
NASA /PSD: Jonathan Rall
AAS: Joel Parriott
NRC (NAC): David Lang, James Lancaster

Many areas of scientific research are experiencing declining selection rates

Where do we get our data from ? What agencies are our “clienteles”

AAAC interacts primarily with NSF/AST, NASA/APD, DOE/HEP Cosmic Frontiers, with increasing overlap with NSF/PHY program in particle astrophysics and gravitational physics, planetary science, and solar and space physics in both NSF & NASA, and the NSF polar program.

NSF Division of Astronomical Sciences: Very extensive database, all proposals traced by reviewer and proposer. Demographic data kept. Queries need to be properly formulated.

NSF Division of Physics: Access to NSF database, but not as extensively mined.

NASA Astrophysics Segregated by competition. (e.g. linking ATP-2012 with anything else has to be done by hand). Some has been done for certain years, but trends are more difficult. Demographic data is not available.

NASA Heliophysics Similar

NASA Planetary Science Similar

DOE High Energy Physics: Hard to connect new comparative review process (2012) to old. Mostly spreadsheet data from the proposal panel organizers.

The AAAC Subcommittee met several times a month through 2014/2015
Compiled the Statistics and refined our mission.

Goals: Produce a short status document for the 2015 AAAC March Report
Produce a longer report for the 2016 AAAC March Report

Success rates for competed research proposals in the Astronomical sciences
Heliophysics, Astronomy & Astrophysics, Planetary Science
have fallen dramatically over the last decade at both NASA and NSF

What is the cause of the change?

We now know a lot more about what it ISN'T

What are the impacts of the change?

Effects on the Agencies (finding reviewers, running panels, etc)

Effects on Researchers (folded in data from the Von Hippel survey)

but we need better stats and additional questions

What is the impact of proposed “solutions”?

Very difficult! Also need to fold in DOE with very different model.

The Interim Report

Impact of Declining Proposal Success Rates on Scientific Productivity

Discussion Draft for AAAC Meeting, November 12-13, 2015

Authors: Priscilla Cushman, Todd Hoeksema, Chryssa Kouveliotou, James Lowenthal, Brad Peterson, Keivan Stassun, Ted Von Hippel

Purpose

- Inform the mid-decadal committee of what we have learned so far, in time for their deliberations
- Provide the AAAC with a document which can be used in the drafting of the 2016 March Report
- Inform the community in order to gather comments and advice (arXiv:1510.01647)

In writing this report, we found that a useful way to restate our goal became:

Can we define/justify threshold success rates?

What is optimum for a healthy competitive environment?

What represents a catastrophic level for Astronomical sciences in the US?

THE PROBLEM

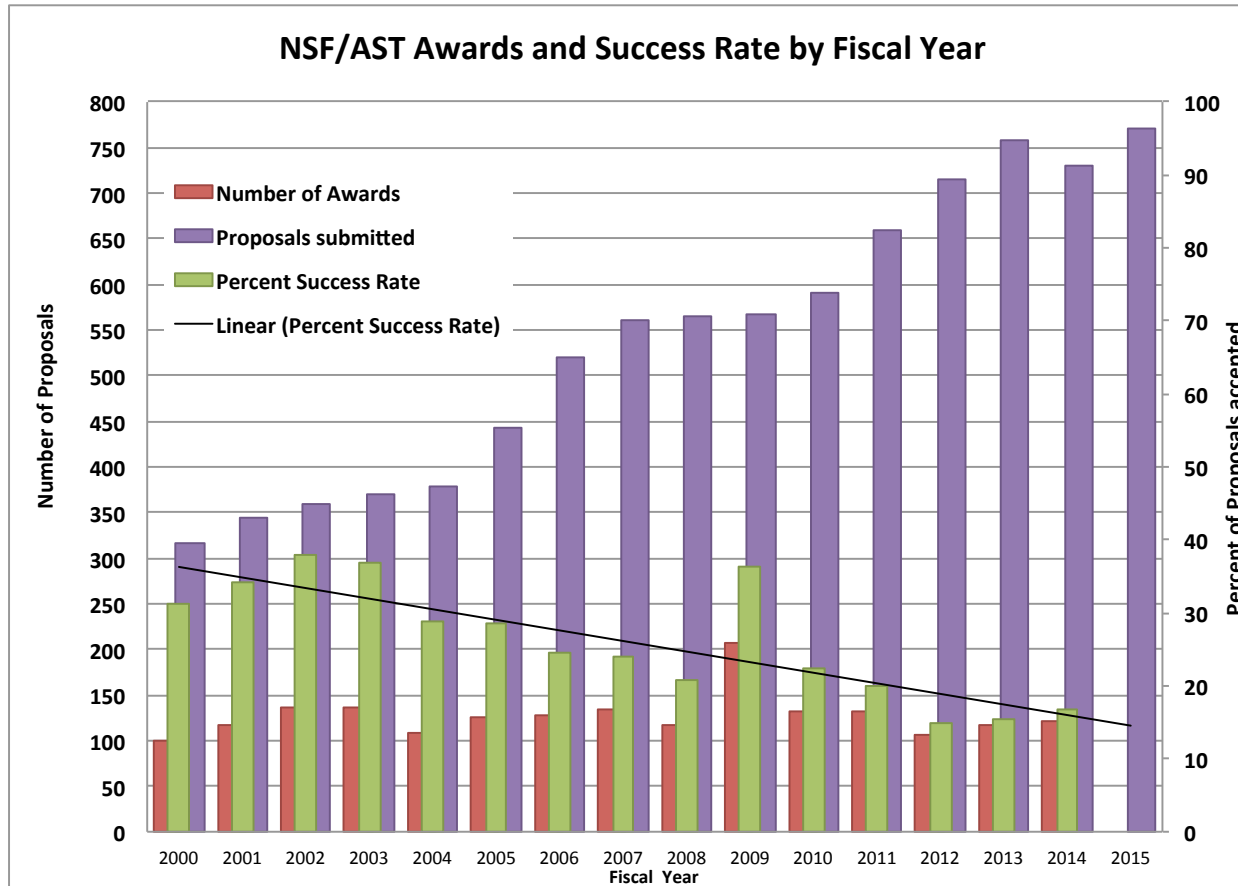
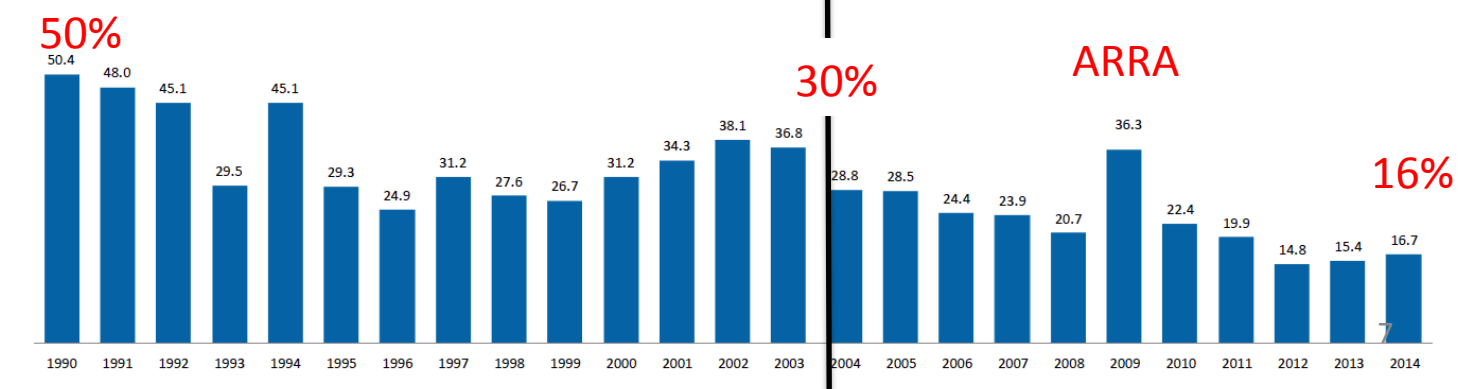
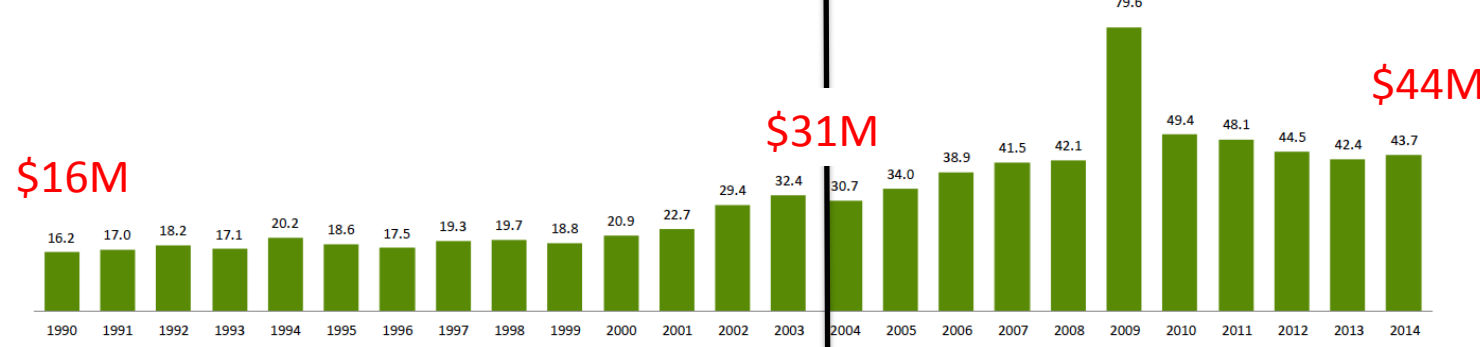
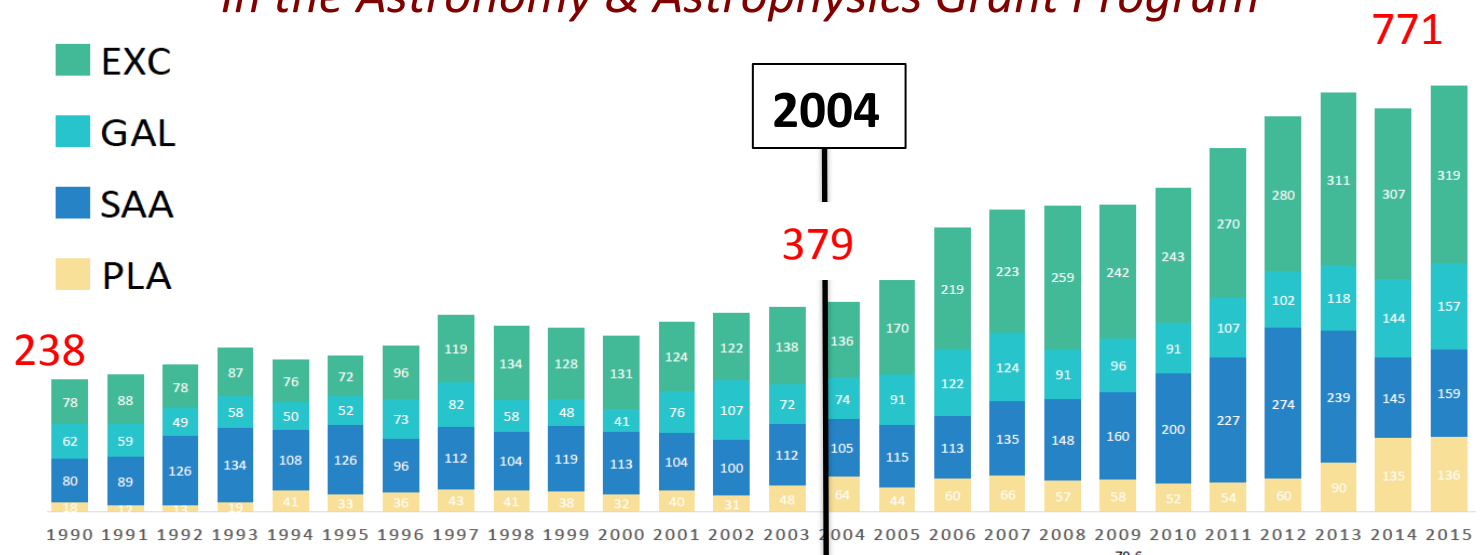


Figure 1 prepared for the Interim Report: Historical NSF/AST (AAG) proposal success rate through 2014. The anomalous spike in FY09 is due to the one-time stimulus provided by ARRA. Data used for this plot and additional plots are found in http://www.nsf.gov/attachments/131083/public/Dan-Evans_AST_Individual_Investigator_Programs-AAAC_Meeting.pdf

Proposal Pressure in NSF/AST *In the Astronomy & Astrophysics Grant Program*



Number of AAG Proposals by program and year

AAG Budget \$M

AAG Proposal Success Rate

2004

379

\$31M

238

771

\$16M

\$44M

50%

30%

ARRA

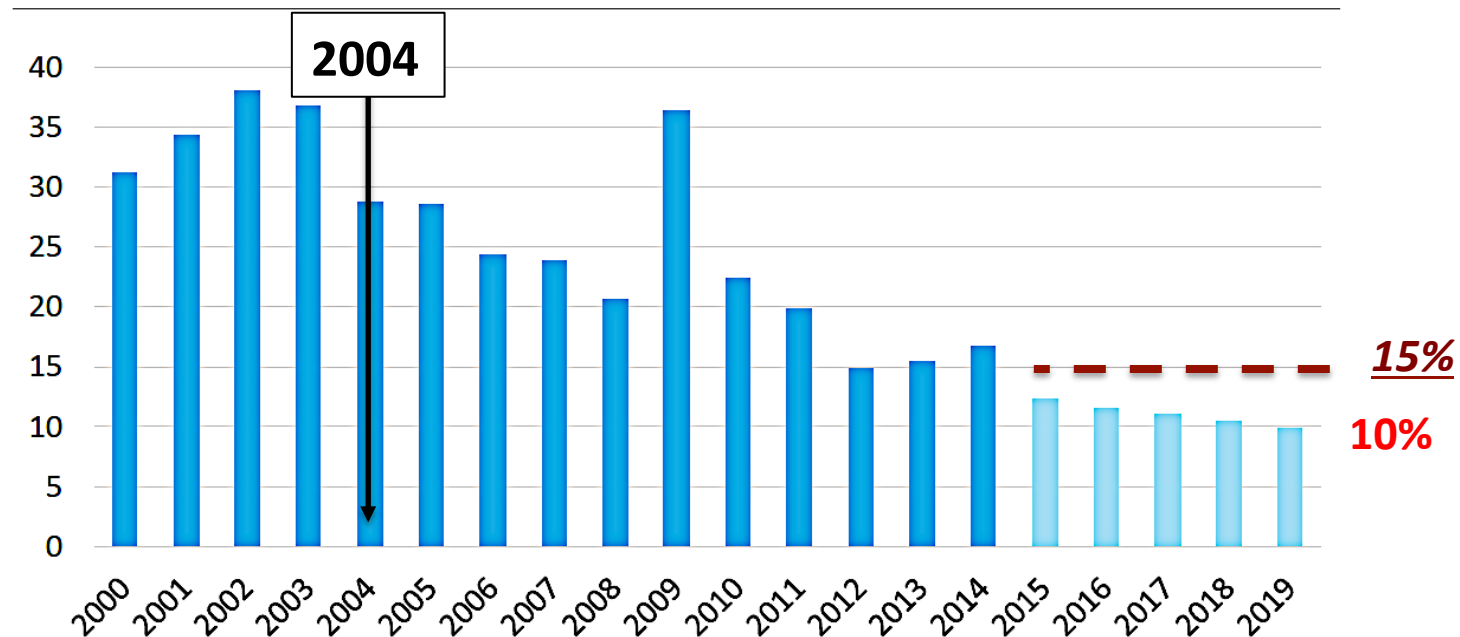
16%

Proposal Pressure in NSF/AST

Observing Facilities Divestment Recommended by Portfolio Review Changes the Balance, But Will Not Solve the Problem

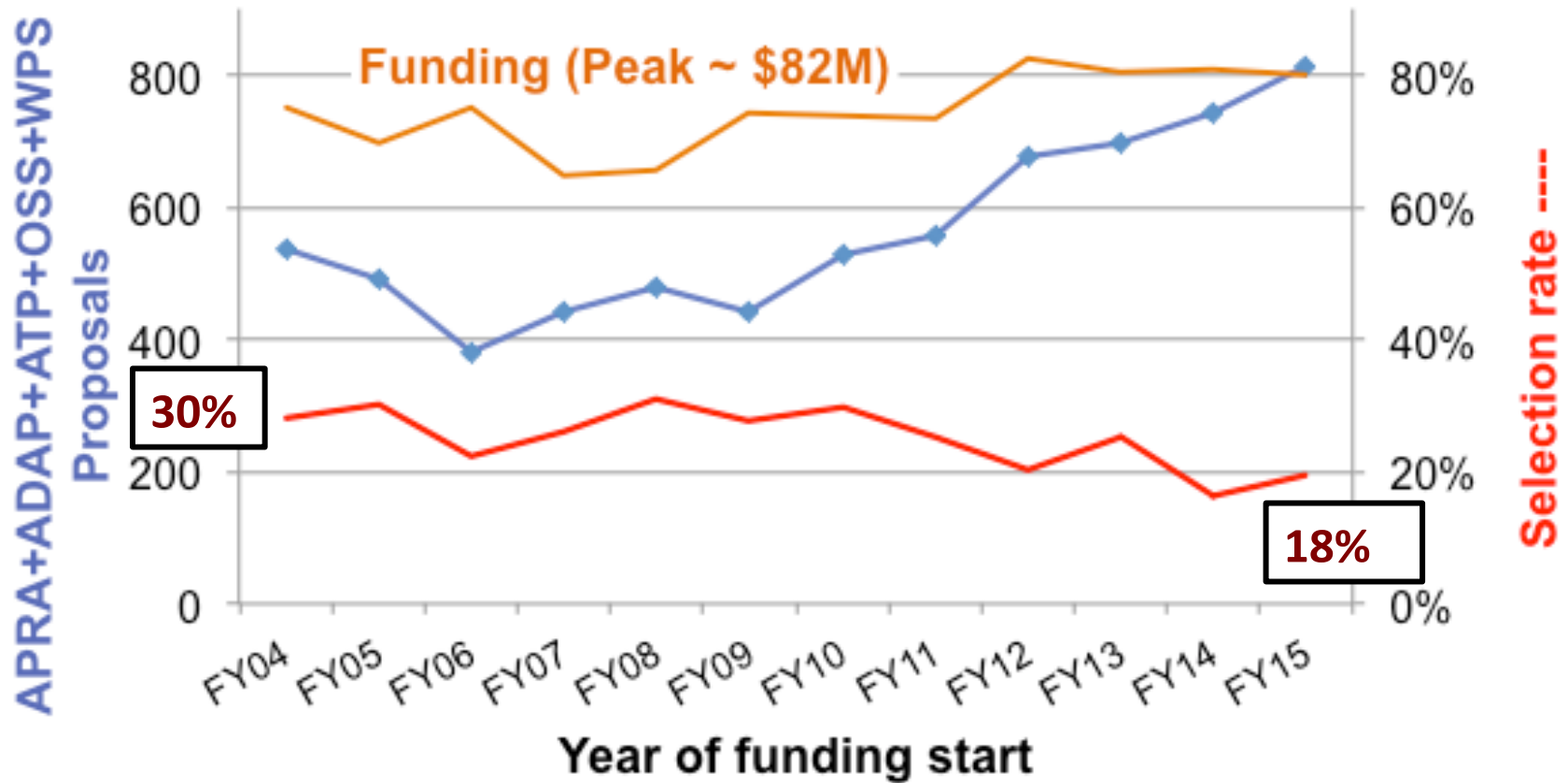
*If divestment continues on schedule and the budget continues flat, proposal success rates will hold at roughly **15%**.*

AAG % Future Success Rates in the Absence of Facility Divestment



*Projected NSF/AST (AAG) proposal success rate **10%** in the **absence of facility divestment**.*

Proposal Pressure in NASA/Astrophysics

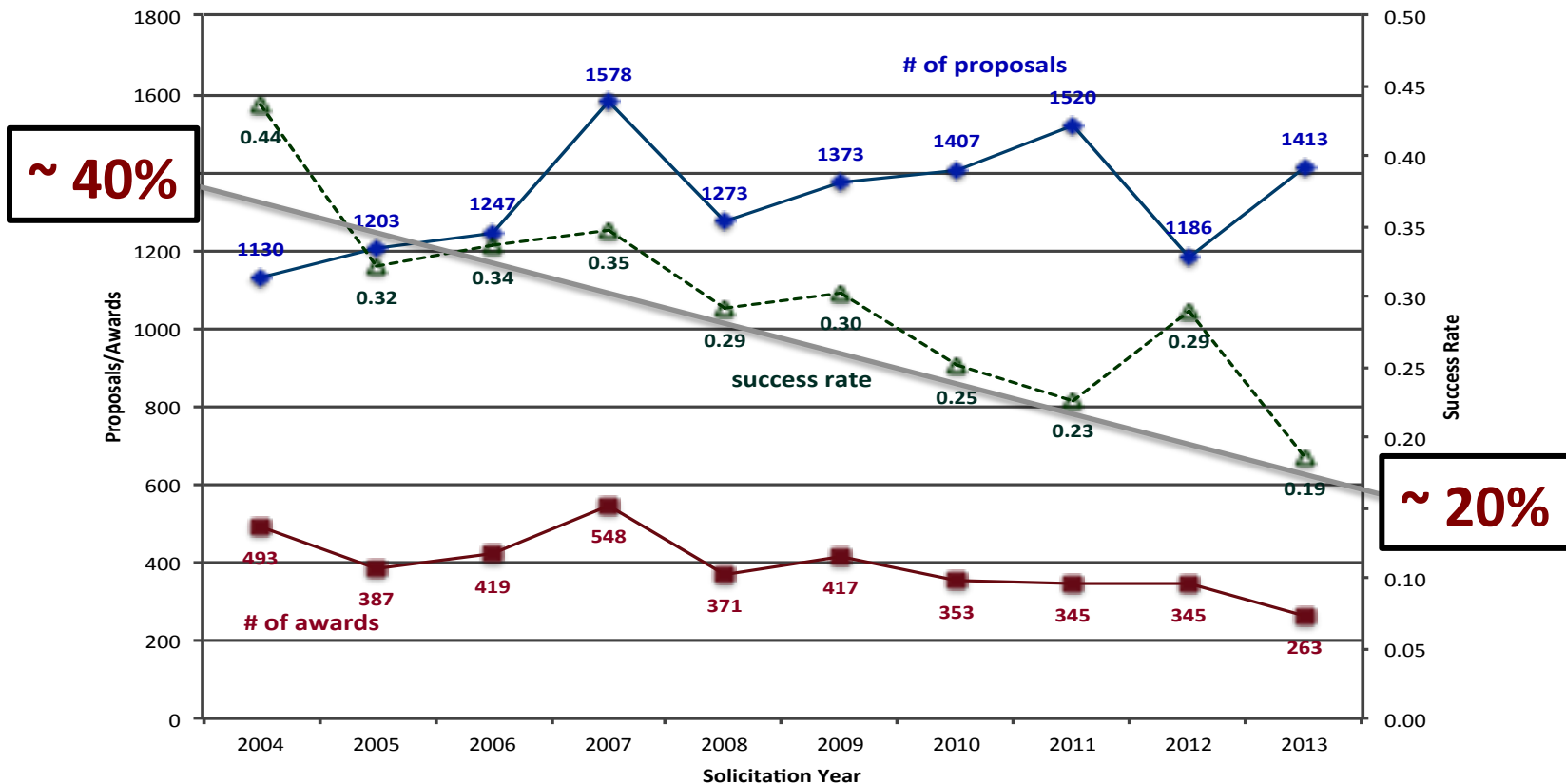


Proposal Pressure in NASA Planetary Science

Total Division Budget (inflation-adjusted):

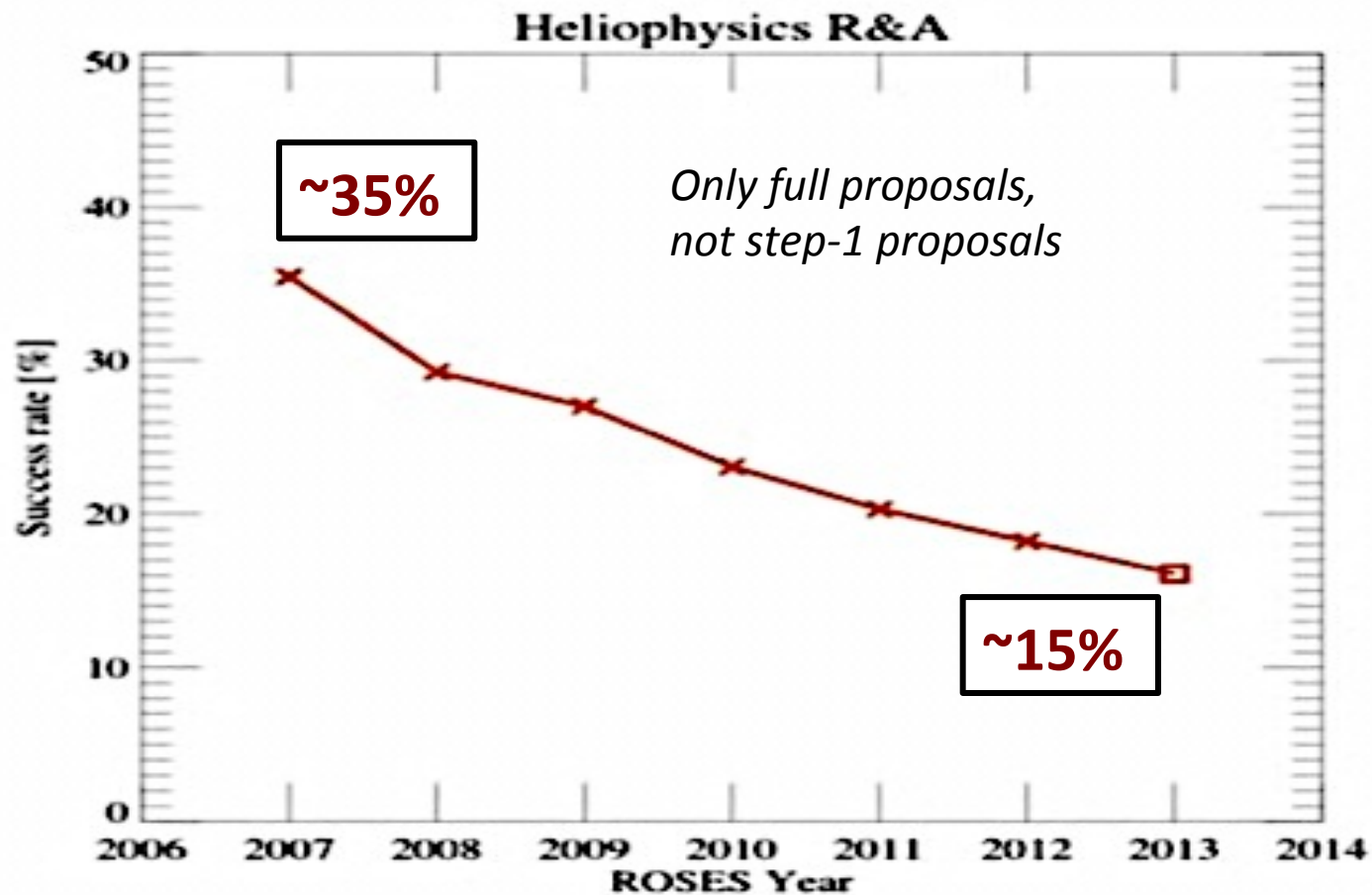
\$1,731M (2004) → \$1,380M (2015)

Proposal Pressure



Proposal Pressure in Heliophysics (NASA)

Overall Selection Rate is falling across NASA/HPD ROSES



Heliophysics with NSF/AGS Solar-Terrestrial Research Program is small and highly variable. It gives out about 25 awards and varies between 20% – 50% funding rate

Proposal Pressure in NSF/PHY - Particle Astrophysics

Astronomy and Astrophysics with Particles (began in 2000)

PA budget has been a steady percentage of the NSF/PHY budget, around 7%

cosmic rays (Auger)

cosmic neutrinos (IceCube)

gamma-rays (VERITAS, HAWC)

dark matter (Xenon, SuperCDMS)

2005 → 2014 Number of proposals doubled (from 30 to 70)

Funding increased ~34%

Average success rate: **45% (2005-7) → 39% (2012-2014)**

	FY	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
NSF (\$M)		5481	5646	5884	6084	8870	7572	6913	7105	6902	7172
PHY (\$M)						358		281	280	253	266
PHY-PA (\$M)		14.7	15.9	16.1	15.8	31.2	17.9	19.2	17.7	18.8	19.7
#grants (incl suppl and CGIs)				84	83	104	110	96	144	127	133
#PIs				74	75	101	134	126	122	121	114
Success Rate (%)		27	57	51	46	73	71	52	54	31	33
Grants vs Facility: IceCube M&O (\$M)								3.45	3.45	3.45	3.45

DOE: High Energy Physics at the Cosmic Frontier

Success rates much higher

- Different Mode: Mostly block grants with multiple PIs.
- Stable number of Universities,
*applying every 3 yrs,
staggered by years*
- \$\$ awarded depends on who is up for renewal
- Comparative review process began in 2012
Energy, Intensity, Cosmic separately reviewed

DOE HEP at the Cosmic Frontier

	FY12			FY13			FY14		
	Amount	# proposals	# PI's	Amount	# proposals	# PI's	Amount	# proposals	# PI's
Request	\$3.3M	10	20	\$7.7M	28	54	\$7.5M	28	38
Funded	\$1.6M	6	13	\$3.4M	18	27	\$3.2M	19	25
Success rate	48%	60%	65%	44%	64%	50%	43%	68%	66%

* Note that \$4.4M was actually provided in FY14 when taking into account fully forward-funded grants.

DOE: High Energy Physics at the Cosmic Frontier

Proposal Success Rates

	HEP All	HEP Renew	HEP New	CF All	CF Renew	CF New
2012	70%			60%		
2013	62%	78%	34%	64%	100%	29%
2014	48%	81%	24%	68%	100%	68%
2015	45%	78%	20%	44%	70%	29%

PI Success Rates

2012	70%			65%		
2013	73%	85%	35%	50%	83%	23%
2014	64%	82%	32%	66%	100%	66%
2015	56%	81%	19%	44%	67%	32%

- Most proposals are not funded at their requested rate
- PI funding rates track proposal success rates
- Cosmic Frontier success rates were somewhat higher than HEP avg in 2012-2014
- New proposals are more than twice as likely not to be funded
- Success rates dropped somewhat in 2015

Summary of Proposal Pressure

- The proposal selection rate for NSF Astronomical Sciences and NASA Astrophysics has been halved, from approximately 30% to 15% in the last decade.
- Similar trends observed in NASA Heliophysics and Planetary Science Divisions
- Trends can be seen overall, but details in individual programs are complicated
 - Programmatic changes or cancellations/suspensions
 - Fewer statistics
 - Changes in the size of awards
- NSF Particle Astrophysics and Heliophysics programs are highly variable
 - Again, program size makes statistics difficult
 - Trend is downward
- DOE High Energy Physics Program has a different funding model
 - Success rate has stayed stable above 50% in Cosmic Frontier (not 2015)
 - Only 4 years of comparative review panel data available

Next, drill down to understand demographics

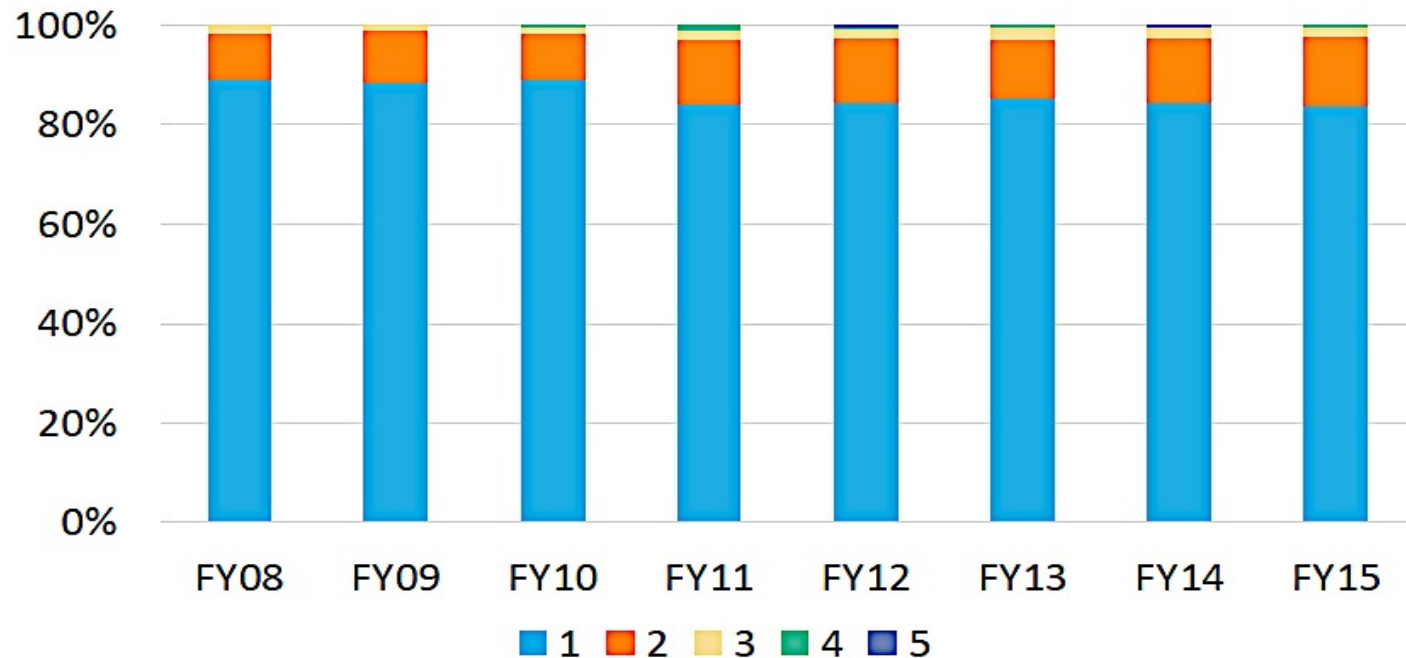
What are some of the causes for the change in proposal success rates?

- Changes in PI submission rate?
- Changes in number of PIs?
- Changes in PI demographics (age, institutions)?
- Changes in Quality of proposals?
- Proposal recycling?
- Changes in the size of proposed budgets?
- Changes (or lack thereof) in Agency budgets?

Most NSF/AST and NASA/APD Proposals are Single Proposals

Proposal Increase → The Actual Number of Unique PIs is rising

Number of Submissions per PI - AAG



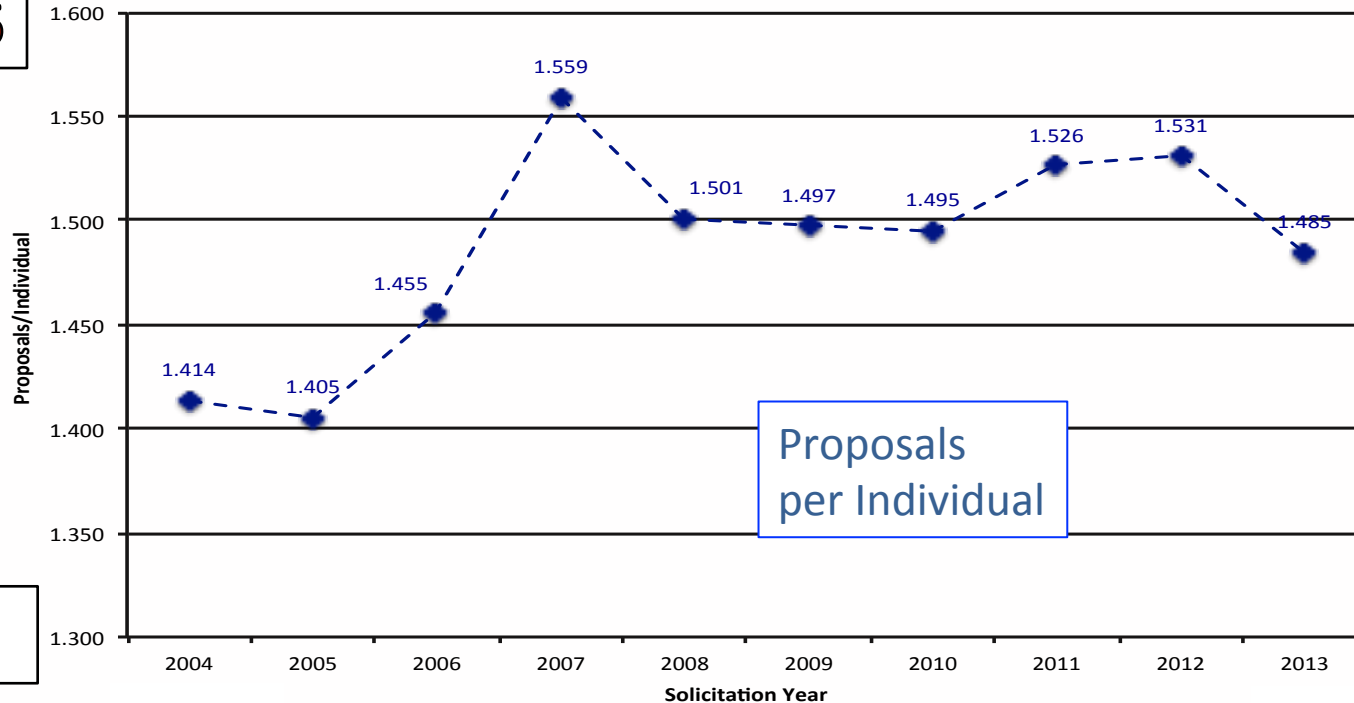
NSF Astronomy: Slow rise from ~11% to ~16% Multiple Proposals

Multiple Proposals in NSF Planetary Sciences

NASA/PSD funding is distributed over 34 programs

Multiple proposals rose from 40% to 60% starting around 2005

1.6



1.3

2004

2013

Recently began using two-step process, where

First Step = Direct proposals to the proper program

and look for largely identical proposals submitted more than once

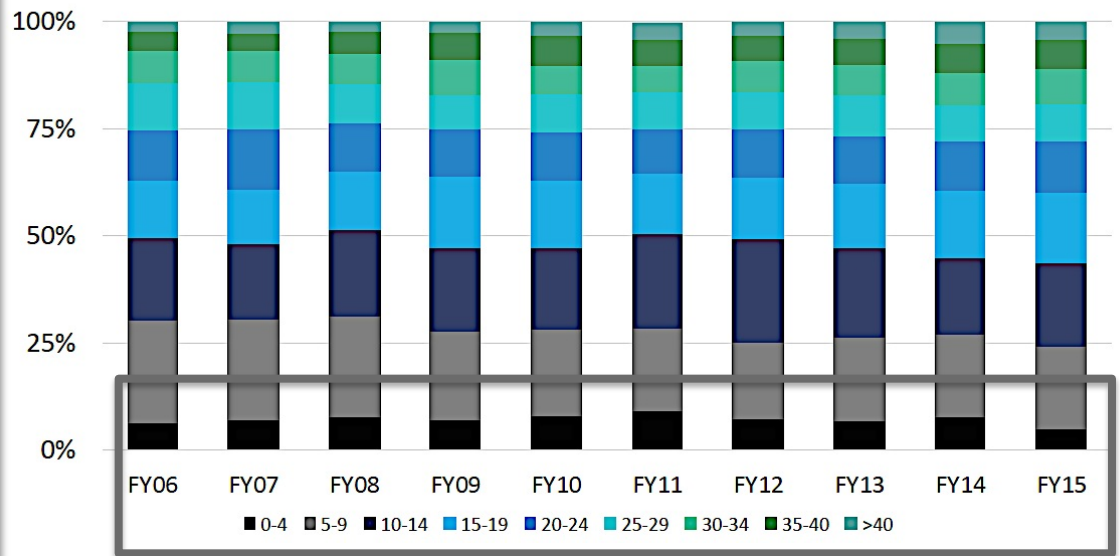
Fraction of Proposals by age of PI (NSF/AST)

No "Postdoc Problem"

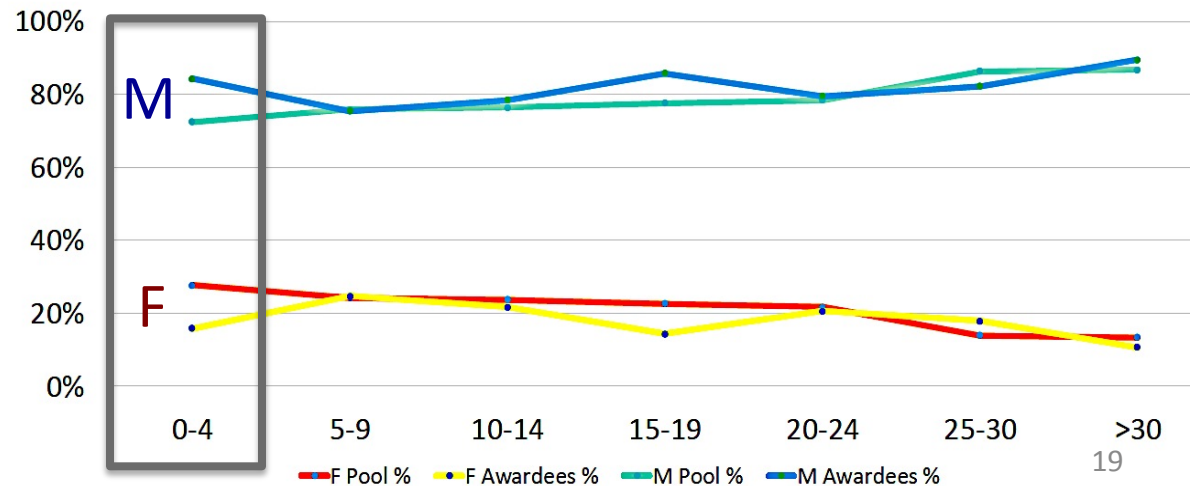
The suggestion that recent generous postdoc fellowship programs and targeted encouragement have boosted one segment of the population that is now moving through the system as an increased PI pool

... is NOT true.

Years Post-PhD of AAG Principal Investigators



Success Rates as a Function of Gender and Post-PhD Years – AAG FY11-14



Result doesn't depend on gender. Slight increase in women in the younger pool is encouraging.

Fraction of Proposals by age of PI

NSF/PHY Particle Astrophysics is slightly different

	Prof	Assoc Prof	Assist Prof	Research Personnel	Female	Male	Number of proposals with at least one Co-PI	Total proposals
FY2008	31	7	5	2	5 (11%)	40	24	45
FY2014	35	12	18	5	17 (24%)	53	23	70

	>24 yrs	20-24	16-20	12-16	8-12	4-8	0-4 years	Total
FY2008	<1984	'84-'88	'88-'92	'92-'96	'96-2000	2000-2004	2004-2008	
	21	4	8	5	4	2	1	45
FY2014	<1990	'90-'94	'94-'98	'98-2002	2002-2006	2006-1010	2010-2014	
	27	10	5	9	10	8	1	70

Fraction of women PIs is rising: 11% (2008) → 24% (2014).

Fraction of younger PIs is rising: 10% (2008) → 27% (2014)

defined as <12 years from PhD.

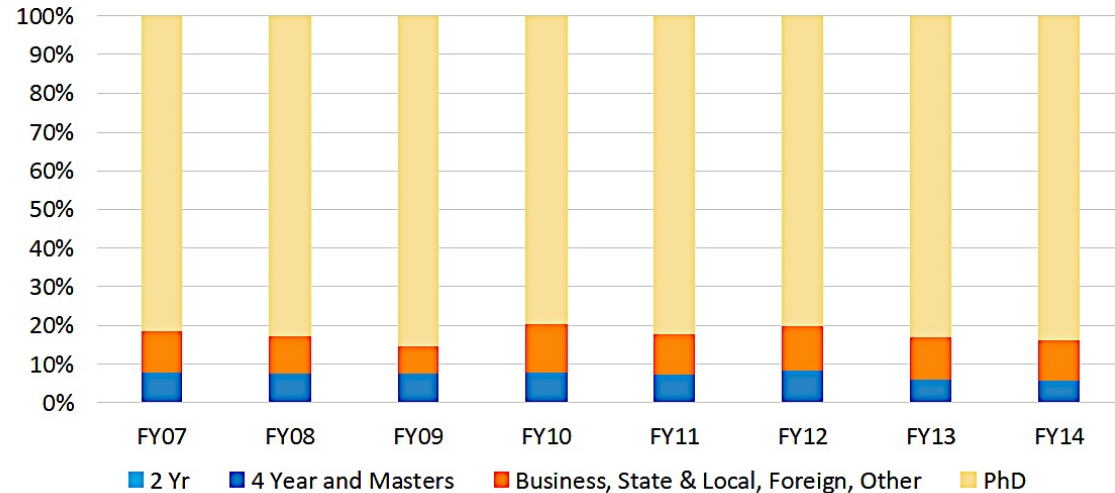
Low statistics

BUT 2008 NSF/PHY PA proposers is heavily weighted toward senior PIs.
2014 NSF/PHY PA age fraction now matches the more stable NSF/AST distribution.

Institutional Affiliation (NSF/AST and NASA)

Proposals from Different Institution Types – AAG

Suggestion:
More proposers from smaller
non-traditional institutions?
NOT true.



Year	Very High Research Activity Universities (107 in the US)				Other Universities		Research Institutes			
	Public		Private				NASA operated or funded**		Other***	
	# Grants	# Unique Institutions	# Grants	# Unique Institutions	# Grants	# Unique Institutions	# Grants	# Unique Institutions	# Grants	# Unique Institutions
2010	53	27	24	10	14	10	18	4	14	9
2011	46	26	23	13	14	12	15	5	30	15
2012	48	21	26	15	10	10	22	5	20	11
2013*	22	15	15	9	9	6	5	2	13	7

*Does not include APRA, which was carried over to 2014

** Includes NASA field centers plus JPL and STScI

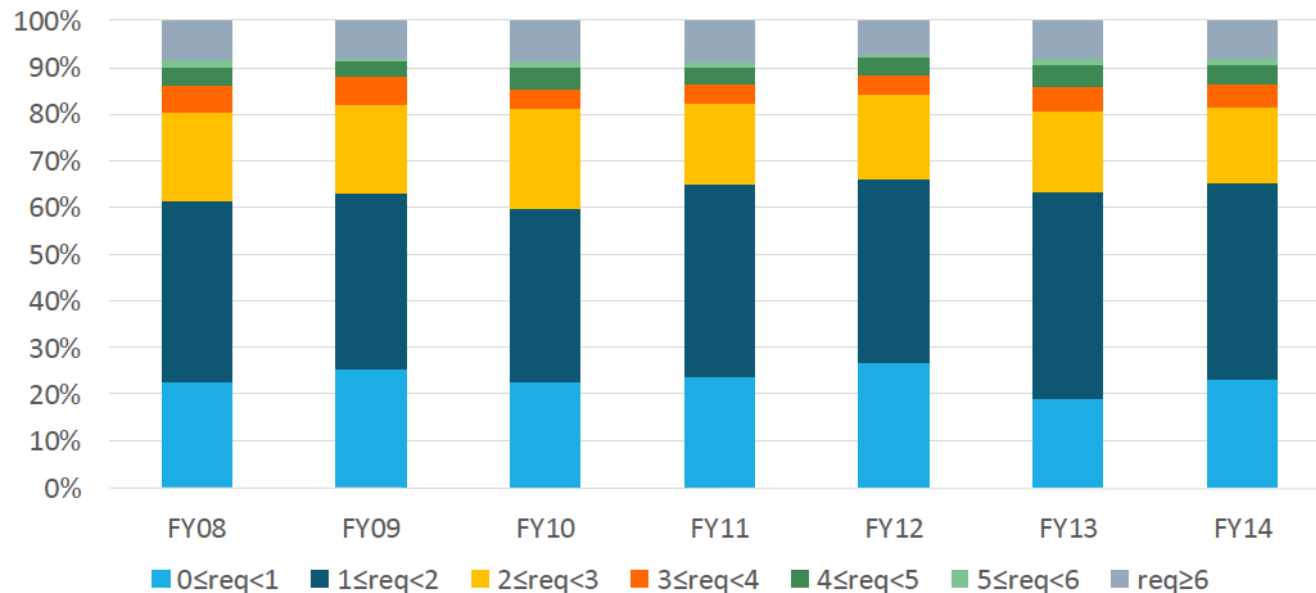
*** Includes, e.g., SAO, Carnegie, SwRI, LBNL

There is no evidence that

Seasoned senior faculty are looking to increase group size

Postdocs seeking soft money support to pay their own way

Months of Salary Requested Per Year – AAG



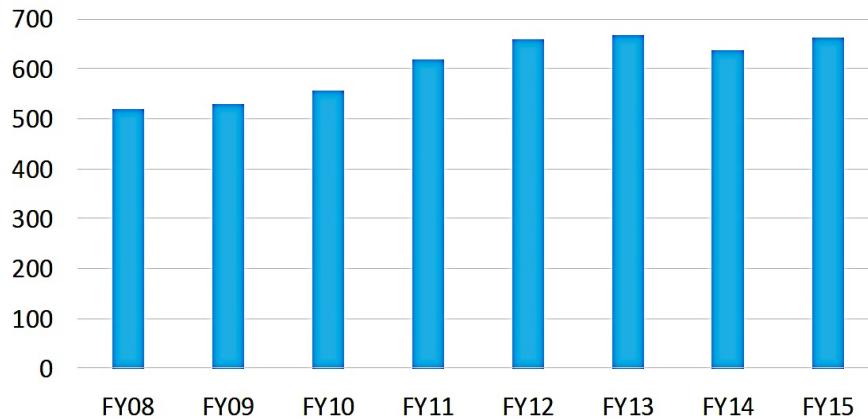
Flat: 80-85% of the proposals request less than 3 mo. Summer salary

It **is** consistent with increased pressure on faculty to have outside funding
7% of AAS members proposed to NSF/AAG in 1990
15% of AAS members do now.

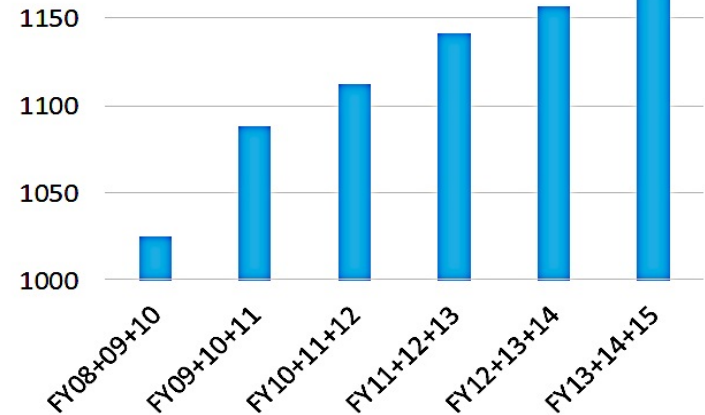
Is Selection Rate being driven by Repeat Proposals?

Number of unique PI per year > 1/3 of unique PI over 3 yr

Number of Unique Proposers each year



Number of Unique Proposers over a 3-yr cycle



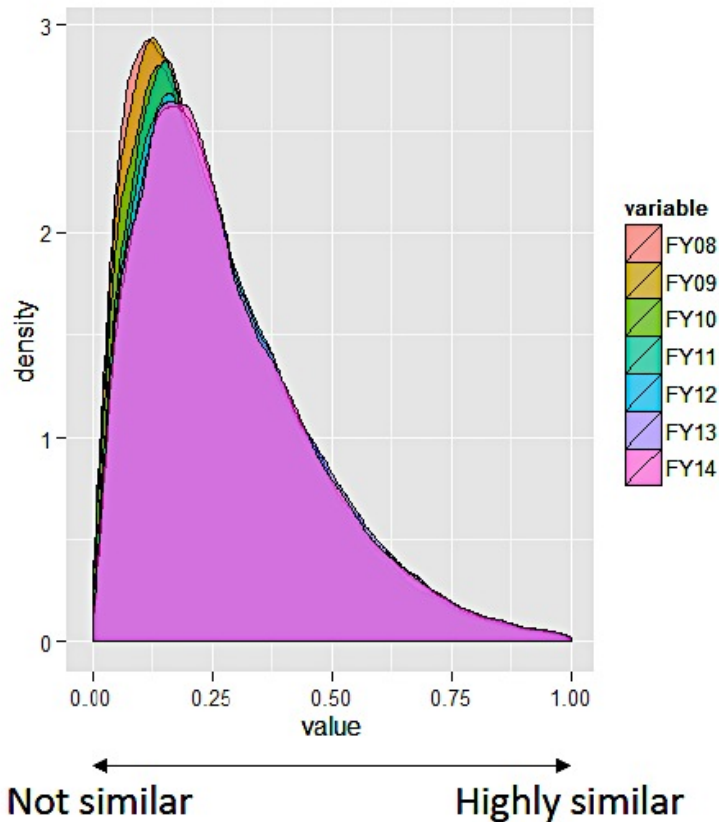
Modeling the data:

- Suppose the number of non-repeat proposals remains steady.
- Successful ones removed from pool, unsuccessful ones reapply next year
- Apply the actual success rates each year to the mix of new and repeat proposals.
- A best fit → 70% of the unsuccessful proposals reapply in the following year.
- If half the proposals are repeats in 2008,
by 2014 second attempts will be 60% of the submitted proposals

Proposal spiral: Ever more unique PIs reapply in consecutive years, accelerating the rise in proposal numbers and falling selection rate (this may have plateaued).

AAG Repeat Submissions Rising

Analysis by Daniel Evans



1. Can use document clustering algorithms to compare the similarity of the text of a given proposal with any proposal submitted in the prior year.
2. Uses morelikethis algorithm and Apache solr to generate vector map of common words in a proposal and compare them with database.
3. Result is that AAG PIs are recycling proposals more often as time goes on.

New Data Tools at NSF/AST may allow a much better handle on repeat proposals and can be applied to other sophisticated analyses.
Jim Neff is willing to help.

Do these numbers just reflect a growth in the community?

We need to refine this - it is crucial to identifying our proposer pool

	1990	2000	2006	2009	2014	Rate of Increase
AAS Full Members	3414	4022		4192	4135	Highly variable
Need to add APS DAP and (DPF?)						
Astro Faculty (AIP data)			1600		1920	2.5%/yr
NASA Proposals				~ 440	~ 720	13%/yr (5 yrs)
NSF Proposals	238	320	514	556	732	8.6%/yr (24 yrs) 6.3%/yr last 5 yrs
Unique Proposers			90%?	520	630	4.2%/yr
Unique proposers over 3 yr cycle				1025 (342)	1160 (387)	2.6%/yr

★ If the number of POOR Proposals is increasing

Good Science is still being performed

But the agencies are overwhelmed with paperwork and panels

The solution to a glut of bad proposals is filtering

However,

★ If Excellent Proposals are being rejected

Then good science is not getting funded

and the field will fall behind those countries willing to spend

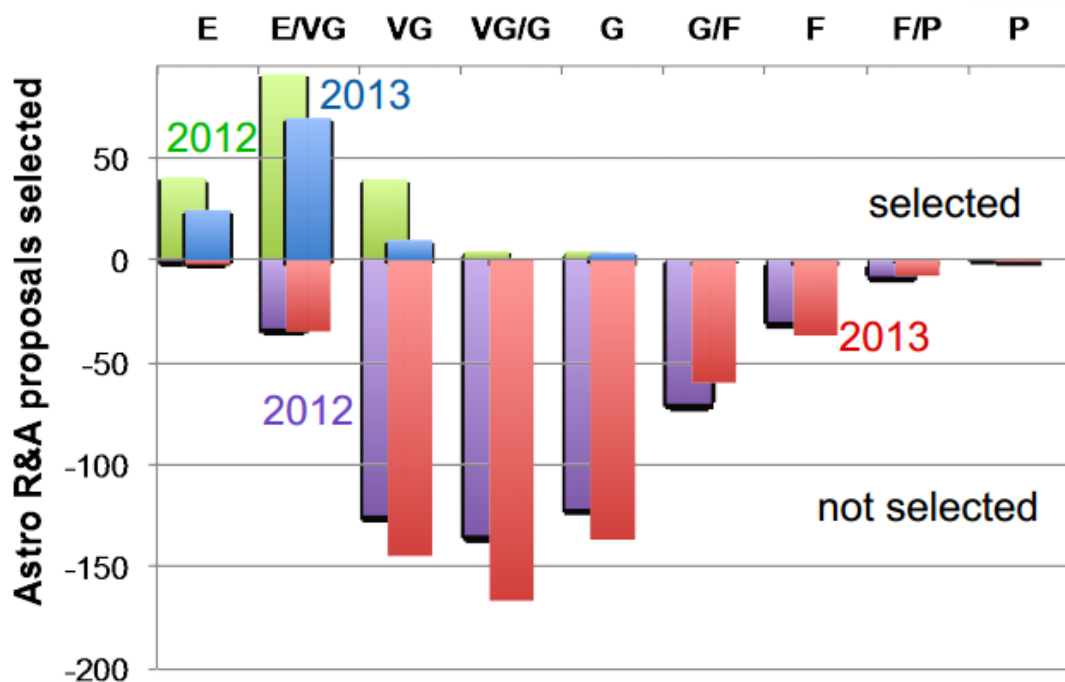
It becomes important to define a **Figure of Merit** to look at trends in
Meritorious Proposal Success Rates

and

Science Output from successful proposals (number of papers? citations?)

Is the number of Meritorius Proposals funded going down?

Reviewer rating is not a good merit indicator for NSF or DOE/HEP Cosmic Frontier
NASA reviewer ratings are more stable,
but anecdotal evidence for NSF and DOE is in line with data from NASA



2012 → 2013

Fraction of proposals rated \geq VG

46.7% → 41.9% (-10%)

Decrease in success rate \geq VG

51% → 39% (-24%)

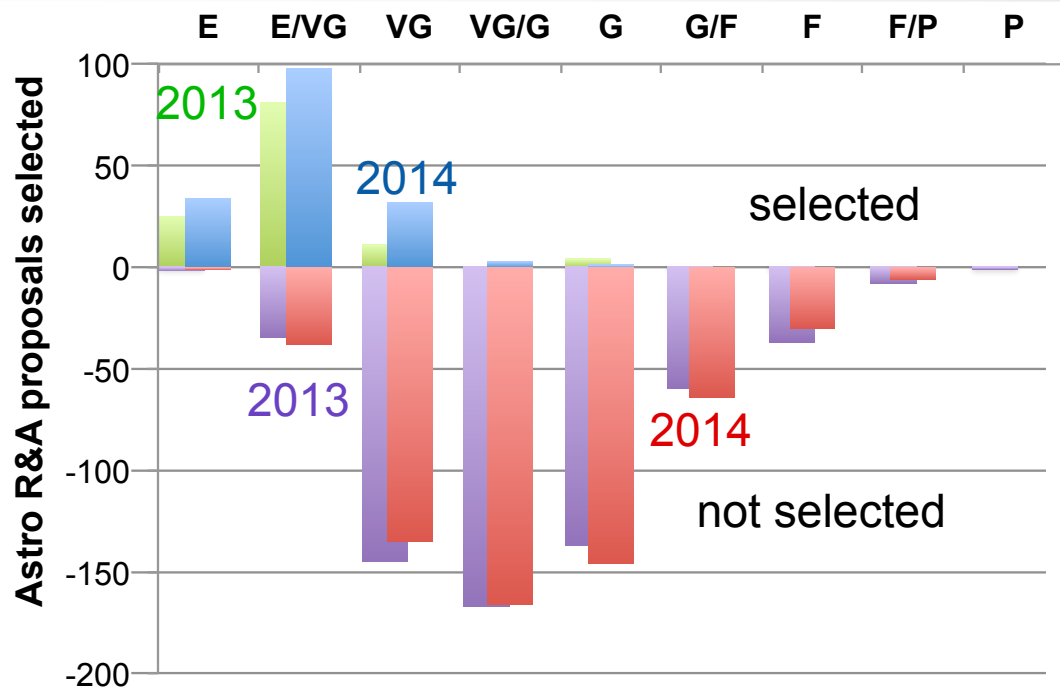
Large Variation from Year to Year!

There is room for improvement here.

Stats across more years, other figures of merit?

More details from Planetary and Helio

Can we quantify NSF or DOE?



2013 → 2014

Fraction of proposals rated \geq VG

41.9% → 44.8% (+7%)

Increase in success rate \geq VG

39% → 49% (+26%)

All SMD ROSES: Number of funded proposals in the VG category was 45% in 2007-2008

Recently: 25% VG (2012) → 7% VG (2013) → 11% (2014)

The Loss is in the VG category, while VG/E and E remain stable at $>75\%$ and $>90\%$ respectively

Summary of Demographics

Only collected for NSF and NASA

- The number of proposers is going up, not just the number of proposals. Multiple proposals from the same PI is mostly not a driver
- The rise in the number of proposers is not coming disproportionately from new assistant professors or research scientists or from non-traditional institutions
- They do not represent a shift in gender or race
- The merit category that is being depleted has a rating of VG
Very Good proposals are not being funded
- Initially unsuccessful proposals are being resubmitted at a higher rate
- Budgets from proposers are not growing, not even keeping up with inflation
- The number of unique proposers seems to track an increase in the size of the field, combined with an increase in the fraction seeking federal funding

What is the impact of more proposals
and declining success rates?

Impact on Agencies

NSF/AST

Managing review panels.

NSF/AST staff FTEs have remained relatively flat

But they are running more panels

Each panel has a higher number of proposals.

Organization and execution of each panel takes 130+ hours (NSF Program Officer)

“NSF has developed new tools to optimize internal review processes, but another 30% increase in proposal volume over the next five years would not be sustainable.”

Recruitment of reviewers and Conflict of Interest

An individual listed as PI or co-PI on an NSF/AST AAG proposal cannot serve as a reviewer.

- 1,100 qualified individuals are prohibited from joining a panel.
- Hard to find un-conflicted senior members of the community to join the panels.
- Declining reviewer acceptance rates; 20-25% of reviewers agree to serve
- Drives up the time program staff spend on appointing panelists.

Impact on Agencies

NASA/APD

(statistics courtesy of H. Hasan)

COST (2014)

832 proposals handled in core R&A programs.

Estimated cost: ~ \$ 3M

NASA staff time, direct expenses for reviewer travel, meeting space, plan, execute, and document the evaluation and selection process

Basis of estimate clearly delineated in spreadsheet.

this cost does not include the cost of the GO program TAC reviews that handle three times as many proposals

FINDING REVIEWERS

Statistics currently: 50% of prospective reviewers accept when asked 4-6 mo.
20% when asked 3-4 weeks ahead

Will this change in the future?

CONFLICTS OF INTEREST

Currently not a problem.

COI issues can often be mitigated by putting the reviewer on a different panel from the problematic proposal

Impact on Agencies

DOE/CF

- The comparative review is an improvement over the previous mail-in-reviews only process.
- The outcomes that we viewed were fair.
as determined by the COV
- Successful at getting reviewers, particularly new reviewers
- 153 reviewers participated in the FY 2015 comparative review process, in which 687 reviews were completed with an average 4.9 reviews per proposal.

Impact on Researchers

Is there a proposal success-rate floor?

A healthy level of competition

identifies the best science and boosts productivity.

Unhealthy success rates

discourage innovation and cause inefficiencies.

- Probability of success / failure
- Cost to scientific productivity
- Cost of review process
- Impact on health of discipline
- Impact on U.S. competitiveness

This data is not available in Agency Statistics

Devise a Survey to be administered to AAS, APS members by AIP

But then...

A new paper appeared which addressed some of our questions

Recruited its author to help with the new survey

Incorporated any relevant previous findings into our Interim Report

Von Hippel and Von Hippel

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0118494>

Size of sample = 113 astronomers (85 male, 25 female; 63 NASA, 50 NSF)
and 82 psychologists (NIH)

Success rate in Survey respondents (they are fairly representative)
31% NASA (compared to 28% from agency stats for that year)
18% NSF (compared to 26% for that year)

Cumulative Probability of Proposer Failure vs. Success Rate

PROPOSAL SUCCESS RATE	<i>P</i> (no funding) 1 try	<i>P</i> (no funding) 2 tries	<i>P</i> (no funding) 3 tries	<i>P</i> (no funding) 4 tries	<i>P</i> (no funding) 5 tries
10%	90%	81%	73%	66%	59%
15%	85%	72%	61%	52%	44%
20%	80%	64%	51%	41%	33%
25%	75%	56%	42%	32%	24%
30%	70%	49%	34%	24%	17%
35%	65%	42%	27%	18%	12%

Table 1. Probabilities of unfunded proposals for different hypothetical funding rates and number of proposal attempts. The green shaded cell represents the state of the field circa 2003 (see Fig. 1). The red shaded cell represents the impending situation expected by FY2018 in the absence of portfolio rebalancing. The yellow shaded cell is the nominal “absolute minimum” benchmark identified here as the point at which new researchers spend more time proposing than publishing papers; it is not a sustainable benchmark and should be regarded as a temporary acceptable minimum.

Assuming independence in funding probabilities from one proposal to the next, the chance of failing to obtain any grants after n attempts is $(1 - \text{funding rate})^n$

Cumulative Probability of Proposer Failure vs. Success Rate

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10%	90%	81%	73%	66%	59%
15%	85%	72%	61%	52%	44%
20%	80%	64%	51%	41%	33%
25%	75%	56%	42%	32%	24%
30%	70%	49%	34%	24%	17%
35%	65%	42%	27%	18%	12%

$P(\text{present funding} \mid \text{past funding}) = 17 \text{ out of } 35 \text{ proposers} \sim 50\%$
 $P(\text{present funding} \mid \text{no past funding}) = 1 \text{ out of } 15 \text{ proposers} \sim 7\%.$

The Matthew Effect - New/unfunded researchers suffer decreased success rates.
 From these admittedly low stats, an average 20% success rate overall actually means ~10% for recently unfunded proposers

N.B. One-half of [NSF] new investigators never again receive NSF funding after their initial award. (2008 AAAS report)

New Investigators – NSF/AAG FY11-14

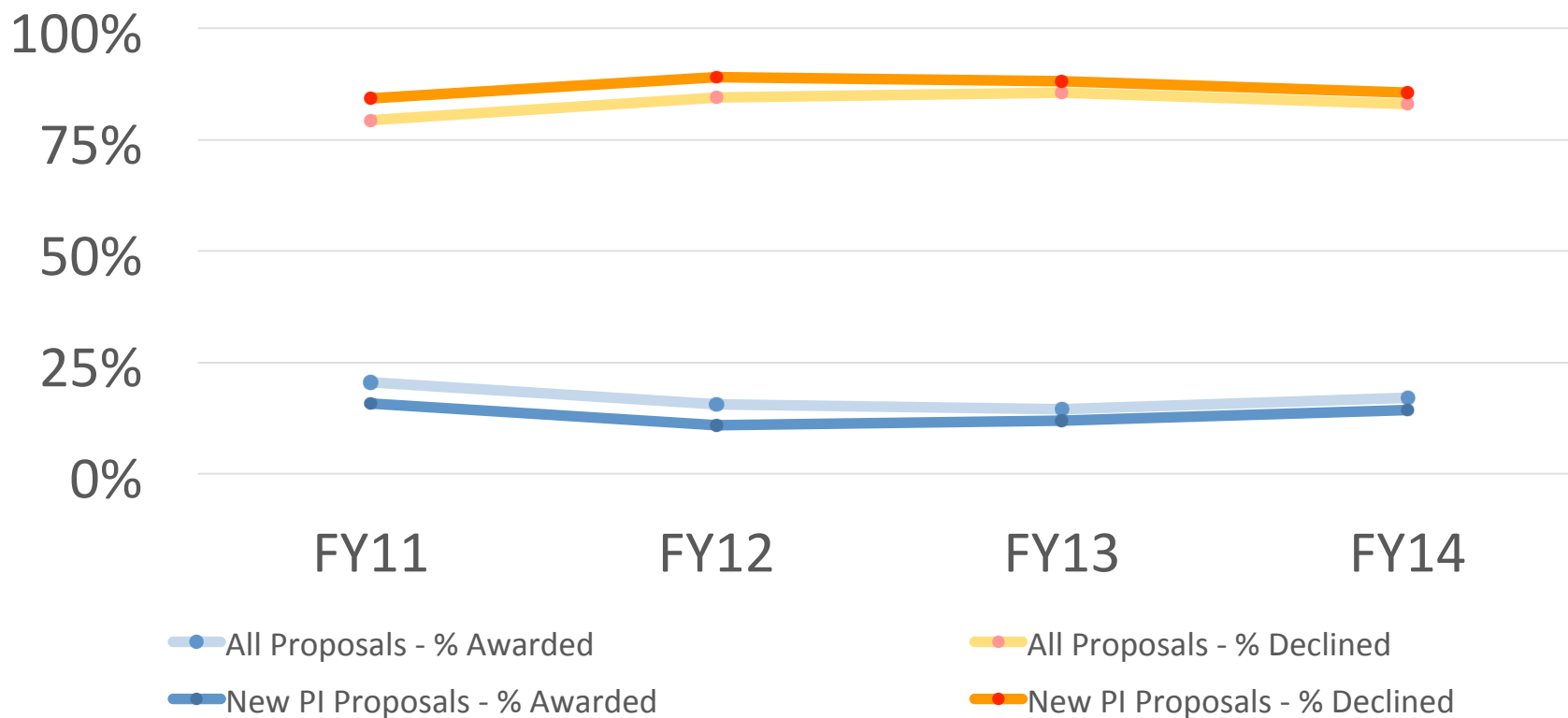
What is the Matthew Effect for NSF/AST ?

Rate of acceptance for new PIs is close to that for old.

Need to remove bias from natural progression of retirements
coupled to the increase in total number of proposers (who must be new)

Success Rates

New PI/Old PI:	77%	71%	82%	85%
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DOE HEP “Matthew Effect”

From Glen Crawford. HEPAP Presentation April 2015

About 43% of the 2015 3-yr proposals reviewed were from research groups that received DOE HEP funding in FY14.

Overall success rate of reviewed proposals in FY15 for previously (newly) funded groups: 78% (20%)

New PI/Old PI =26%

Overall success rate of reviewed Senior Investigators in FY15 for previously (newly) funded groups: 81% (19%)

Clear Differences which depend the Agency funding model

High Energy Physics research style (inherited by Cosmic Frontier) is very different than Astronomical Sciences but may be changing.

The Opportunity Cost of Writing Proposals

Von Hippel & Von Hippel survey:

PI: Takes 116 hours to write a proposal

Co-I: Takes 55 hours

That translates into a number something like 0.4 papers.

With success rates at 20%

the time cost of writing a successful proposal is
greater than the time it takes to write 2 papers.

The typical astronomy grant results in about 8 publications.

As success rates fall even further, new researchers with success rates at 6% will spend more time writing proposals than would be spent writing the papers that result from a successful proposal.

Summary & Remarks

- Increase in the number of PIs and in many programs long no-growth budget profiles have led to decreasing proposal success rates.
- The cause does not lie in changing demographics, proposal quality, grant size.
- The tendency to recycle proposals exacerbates the problem.
- Lower success rates stress the agencies, reviewers, the community, and the nation.
- Success rates greater than 30% are healthy.
- Success rates of 15% are not sustainable – anecdotally people are leaving, panels are more risk averse, and new researchers are not entering the field.

The solutions are not clear.

More funding

Rebalancing the program

Fiddling with the process – grant size, grant opportunities

Decreasing the size of the U.S. astronomical science community

– strategically or not

FUTURE PLANS

- We will continue to work with AAAC to produce the best data for the 2016 March Report

The AAAC report will be formal:

A Set of findings and recommendations that go to congress

Pass a formal approval process

No time for any further survey

- In Parallel, we are committed to a new survey:

Higher Statistical Samples

Specifically investigate impact of possible “solutions”

Sent to AAS, APS members, administered by AIP

- Continue to refine data from Agencies
- Analyze the survey and combine it with improved data
Publish a Paper by summer of 2016

Backup Slides for Discussion

Pages from our wiki:
State of Play

Impact on Researchers Requires a Survey

Answer these questions with a scale: strongly agree <--> neutral <--> strongly disagree)

- How would the following actions by the funding agencies affect you?
 - Limiting applicants to one PI or CoI proposal per year:
 - would increase the time I could spend on my research
 - would reduce my chances for tenure.
 - would cause me to leave the field.
 - would reduce the number of proposals I submit.
 - would improve the quality of those proposals I submit
 - would reduce the size of my research group
 - Calling for proposals every other year
 - Etc..
 - Introducing a pre-proposal stage
 - Etc...
 - Introducing an exploratory stage with minimal funding.
 - Etc...
 - Reducing the amount of funding for individual proposals
 - Etc..

Impact on Researchers Requires a Survey

2. Personal Choices, tracking futures

- If my proposal is rejected, (choose one answer that best represents your action)
 - I resubmit the same proposal the next year
 - I submit a different type of proposal the next year
 - I support my research on someone else's grant
 - I submit a similar proposal to a different federal funding source
 - I submit a similar proposal to a private funding source
 - I concentrate on other aspects of my job (e.g. teaching)
- If I am unsuccessful at obtaining federal funding for 5 years, I am most likely to
 - Switch research fields
 - Switch jobs into something that does not require resea
 - Concentrate on non-federal funding sources
 - Move to another country in order to pursue the same research field

3. Demographics


PLEASE ADD YOUR SECTIONS HERE

Additional information from AAS and APS to augment Survey

aaac:aas

American Astronomical Society

Questions and Available Data

- Our digital job register data goes back to 2003.
- Our digital membership data goes back at least 10 years.
 - Demographic information is self-reported and not broadly consistent with federal standards of classification.
 - Our membership data will have the unclear bias of “people who choose to be AAS members.”
 - It is not obvious how this would bias the information.
 - Possible examples:
 - Are we undersampling small institutions?
 - Are some other institutions over or under-represented based on local department culture?
 - Are astronomers from certain types of institutions more likely to be AAS members?
 - In addition, the overlaps between our membership and the proposing-and-funded or proposing-and-not-funded cohorts are unclear.
- We think we could provide a secondary estimate of the field demographics to compare to the agencies' datasets, but as a primary source, our data would introduce unclear biases.
- Draft v2 of our proposed AAS member survey on grant proposal success rates available  [here](#)

Links to Existing talks, trending graphs, relevant information


- Click on **Resources**

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More Agency Statistics and Analysis

Sharpen arguments from the Agency statistics.

The  *Longer report on Proposal Pressures* that was not in finished form by the March 2015 AAAC report. What are the questions not yet answered, what additional information is required to make a case.

Further analysis of the proposal per year and proposal per 3 year NSF data

A few more snapshots of the NASA Astrophysics merit criteria.

Explore further effect of pre-proposal strategy on those that have tried it

Detailed comparison of DOE Cosmic Frontier model vs NSF, NASA wrt results. Any lessons to be learned?

Better data on cost per proposal and number of PI's on proposals, etc

Investigate the trend on the average funding per proposal in both agencies

Bring the Heliophysics and Planetary stats up to the level of NASA/APD and NSF/AST

Of Course It Is More Complicated: Breakdown by Program

Avg size of annual awards increased

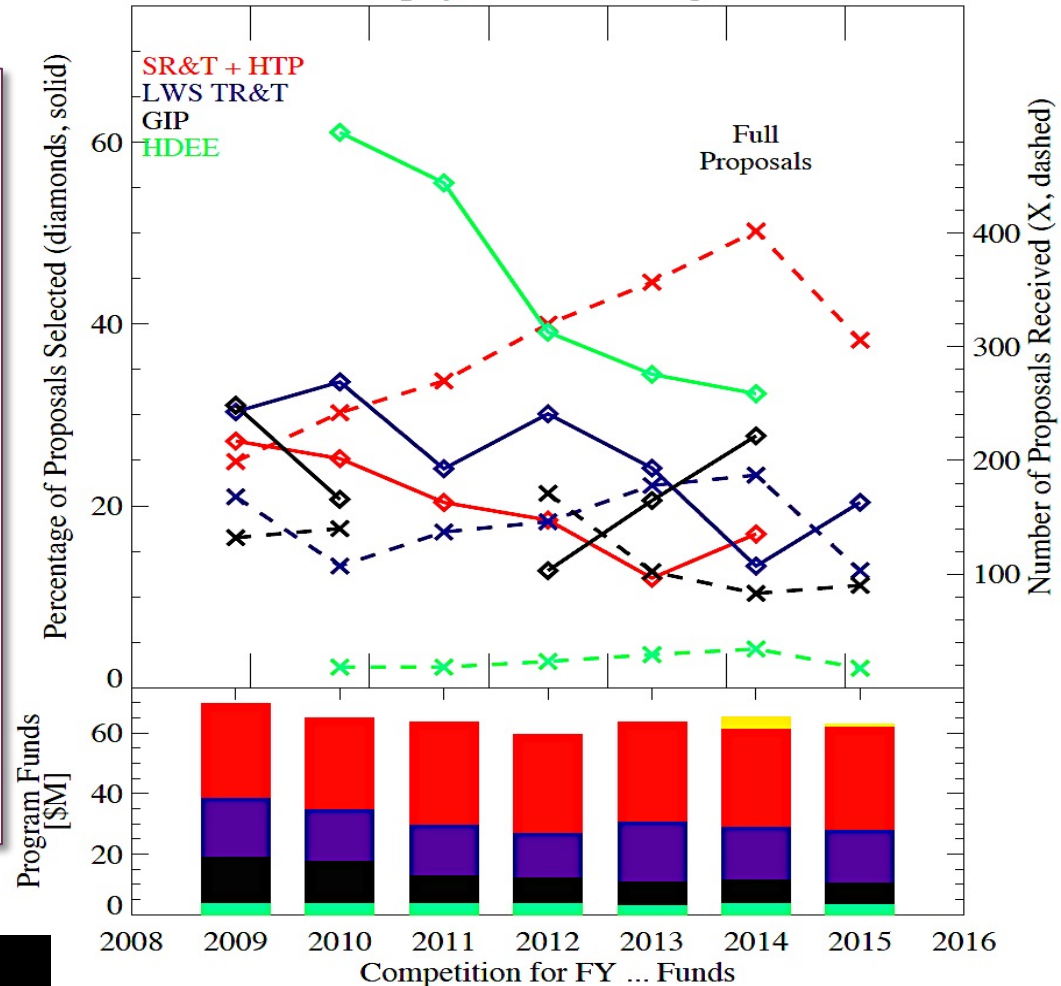
Over 50% of these are “unique PI”
i.e. the only proposal submitted

The more programs open, the higher
the multiple proposal submissions

The balance in gender ~83% male
- if identified !

Heliophysics Guest Investigator Program
was suspended in FY 2011

Heliophysics R&A Programs



Heliophysics Guest Investigator program.

Living With a Star Targeted Research and Technology program.

Heliophysics Supporting Research and Technology program Heliophysics Theory program.

Heliophysics Data Environment Enhancements program.

SR&T Heliophysics Cubesats