

# Biology at the National Science Foundation

**Dr. John C. Wingfield**  
**Assistant Director for Biological Sciences**



Science Policy Committee Symposium  
Experimental Biology 2013  
Boston, Massachusetts  
April 24, 2013

# Biology at the National Science Foundation

**Division of Molecular and Cell Biology**

**Division of Integrated Organismal Systems**

**Division of Environmental Biology**

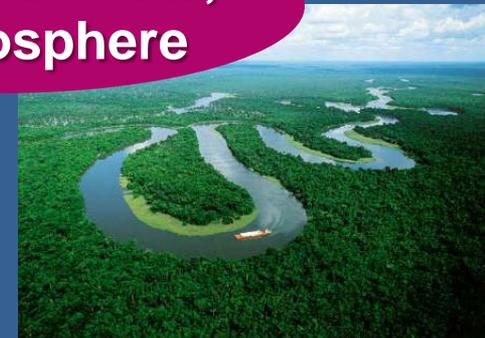
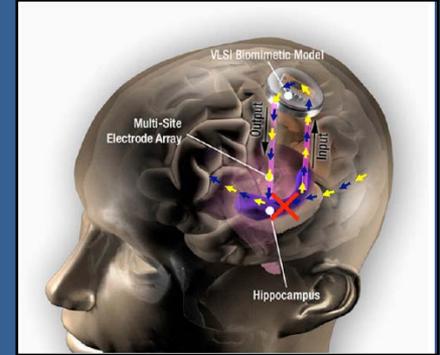
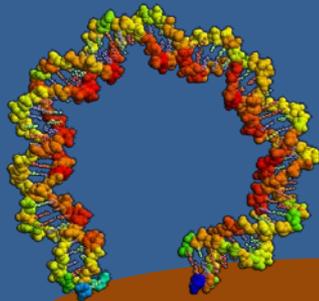
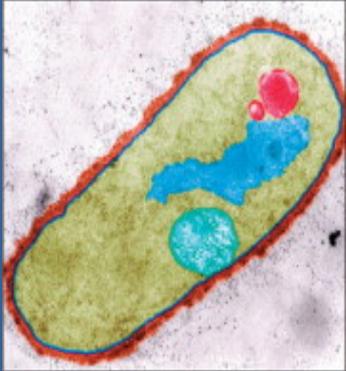
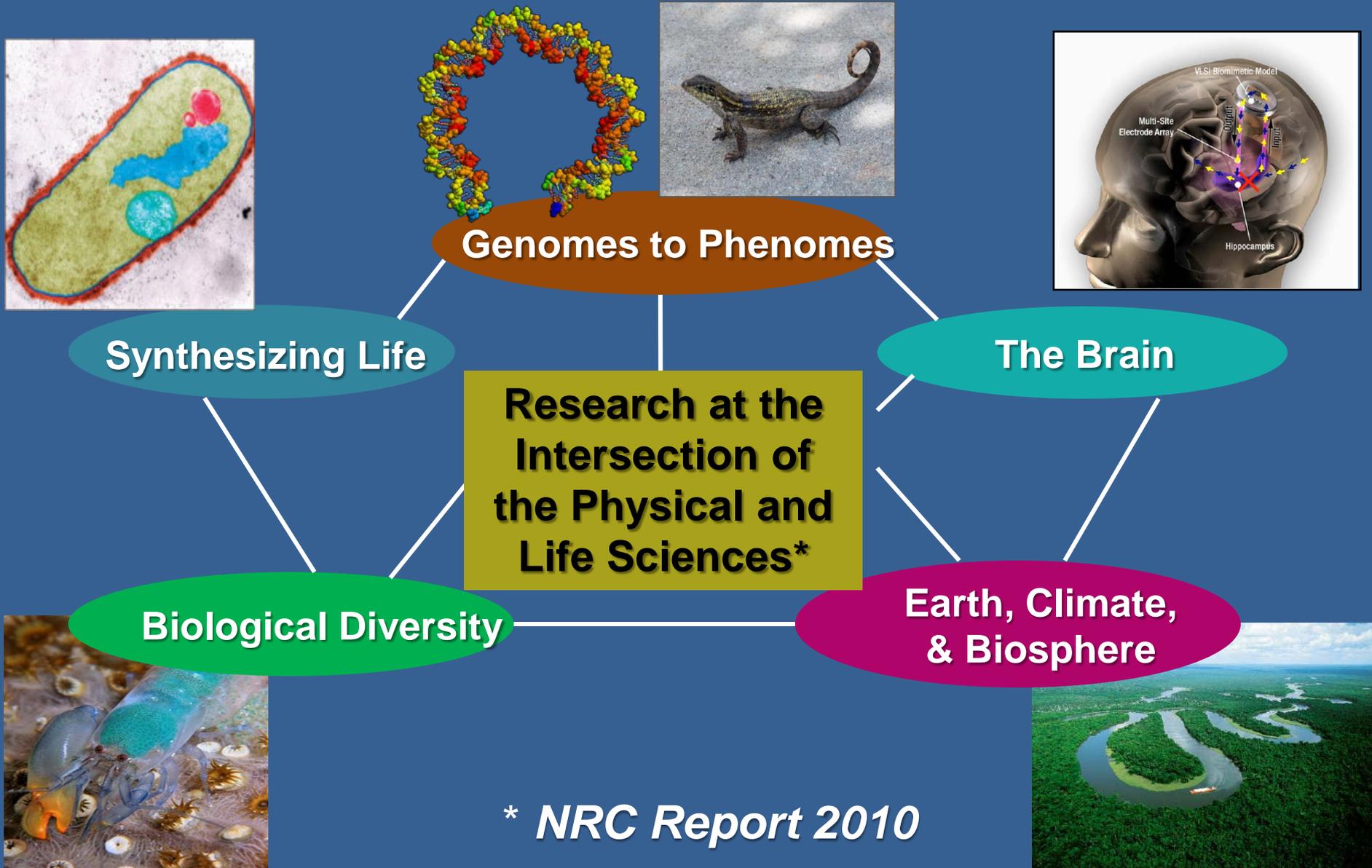
**Division of Biological Infrastructure**

**Emerging Frontiers**

***Environment, food, energy  
and health***



# Five Grand Challenges for 21<sup>st</sup> Century Biology



# BIO Ongoing Investments

- **Five Grand Challenges (2010 National Research Council Report)**
- **Neuroscience – Understanding the Brain**
- **BioMaPS: Research at the Interface of Biological, Mathematical and Physical Sciences, and Engineering**
- **CLF21: Cyber Infrastructure for the 21<sup>st</sup> Century**
- **SEES: Science, Engineering, and Education for Sustainability**

# Developing BIO Priorities

- **SIBS: Strategic Integration for Biological Sciences**
- **PULSE: Partnerships for Undergraduate Life Sciences Education**
- **NEON: National Ecological Observatory Network**

# NSF FY 2013 Budget Request

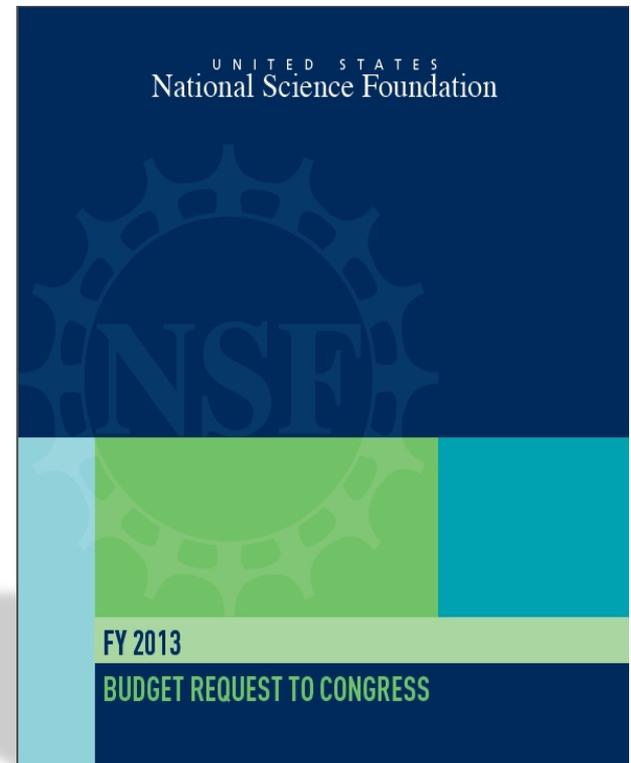
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## NSF FY 2013 Budget

**TOTAL: \$7.373 billion**

**Increase: \$340 million**

**4.8% over FY 2012 enacted**



# BIO FY 2013 Budget Request

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**TOTAL, BIO R&RA: \$733.86 million, +3.0%**

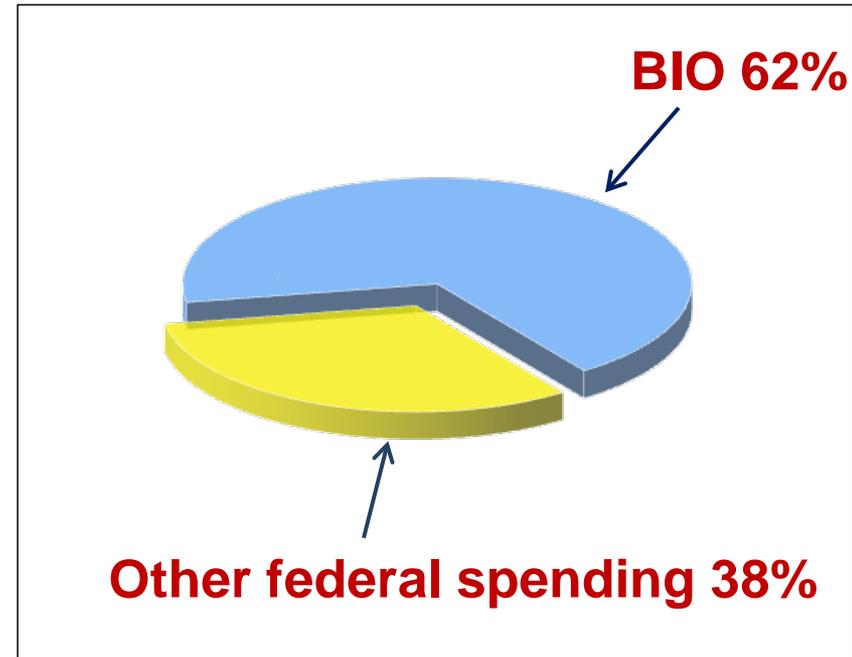
**Research: \$552 million**

**Learning: \$30 million**

**Infrastructure: \$141 million**

**Administration: \$11 million**

**NEON 3<sup>rd</sup> Year Construction:  
\$91 Million**



**Federal Support for Basic  
Research in Non-Medical  
Biological Sciences at  
Academic Institutions**

# BIO FY 2013 Budget Request

## Biological Sciences Funding (Dollars in Millions)

	FY 2011 Actual	FY 2012 Current Plan	FY 2013 Request	Change Over FY 2012 Estimate Amount	Percent
<b>Molecular and Cellular Biosciences (MCB)</b>	<b>\$123.93</b>	<b>\$125.79</b>	<b>\$132.68</b>	<b>\$6.89</b>	<b>5.5%</b>
<b>Integrative Organismal Systems (IOS)</b>	<b>212.56</b>	<b>212.33</b>	<b>220.52</b>	<b>8.19</b>	<b>3.9%</b>
<b>Environmental Biology (DEB)</b>	<b>142.72</b>	<b>142.56</b>	<b>143.73</b>	<b>1.17</b>	<b>0.8%</b>
<b>Biological Infrastructure (DBI)</b>	<b>129.28</b>	<b>126.18</b>	<b>129.68</b>	<b>3.50</b>	<b>2.8%</b>
<b>Emerging Frontiers (EF)</b>	<b>103.79</b>	<b>105.52</b>	<b>107.25</b>	<b>1.73</b>	<b>1.6%</b>
<b>Total, BIO</b>	<b>\$712.27</b>	<b>\$712.38</b>	<b>\$733.86</b>	<b>\$21.48</b>	<b>3.0%</b>

**Totals may not add due to rounding.**

# What Changed?

**The MCB solicitation accepts full proposals on an eight month cycle. Now 12 month cycle**

**The IOS and DEB solicitations both:**

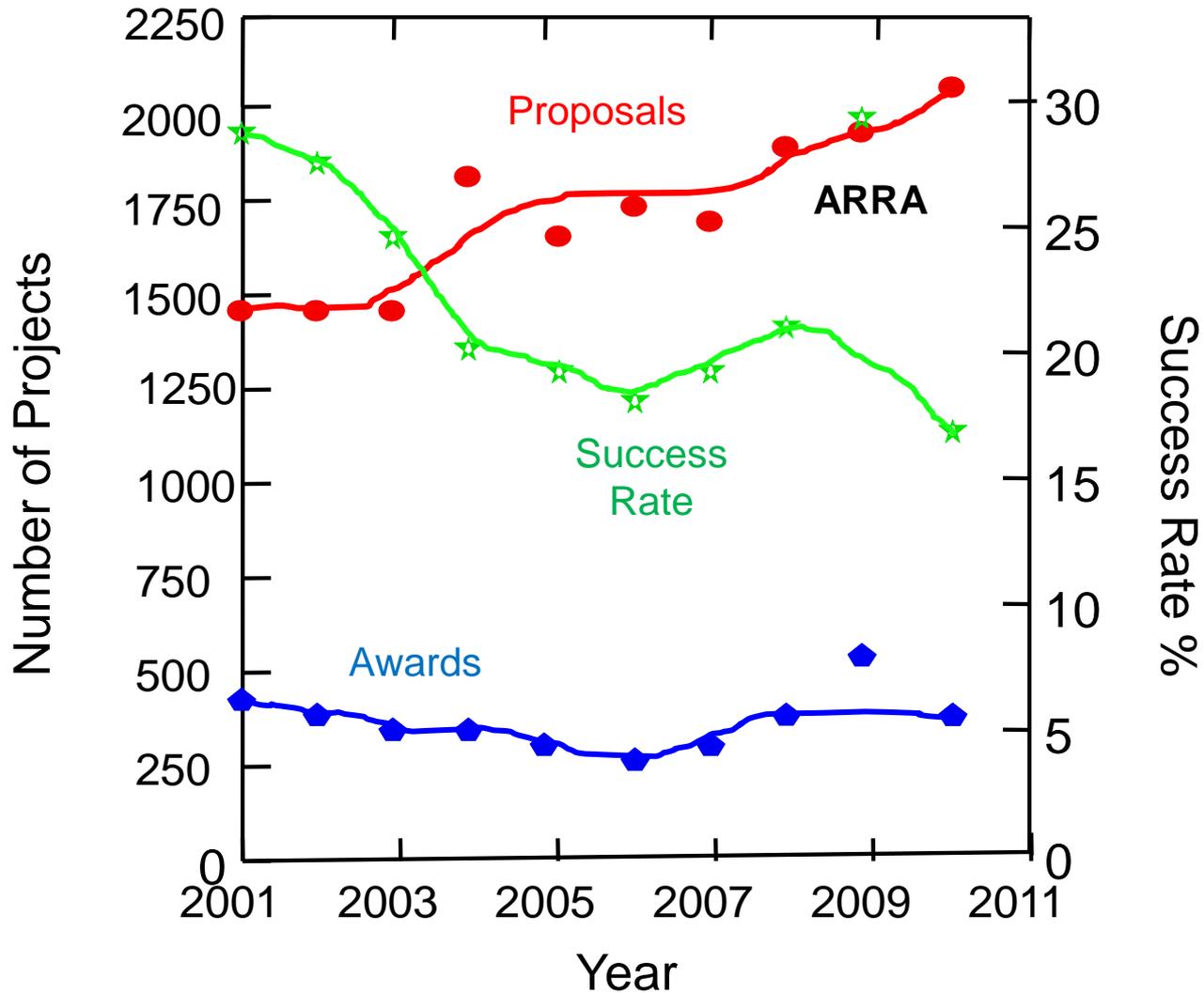
- 1. Require a pre-proposal submission in January followed by full proposal deadline in August.**
- 2. Full proposals can be submitted ONLY if invited by the program based on review of a pre-proposal.**

# Management Innovation: Changes in Proposal Submission to BIO

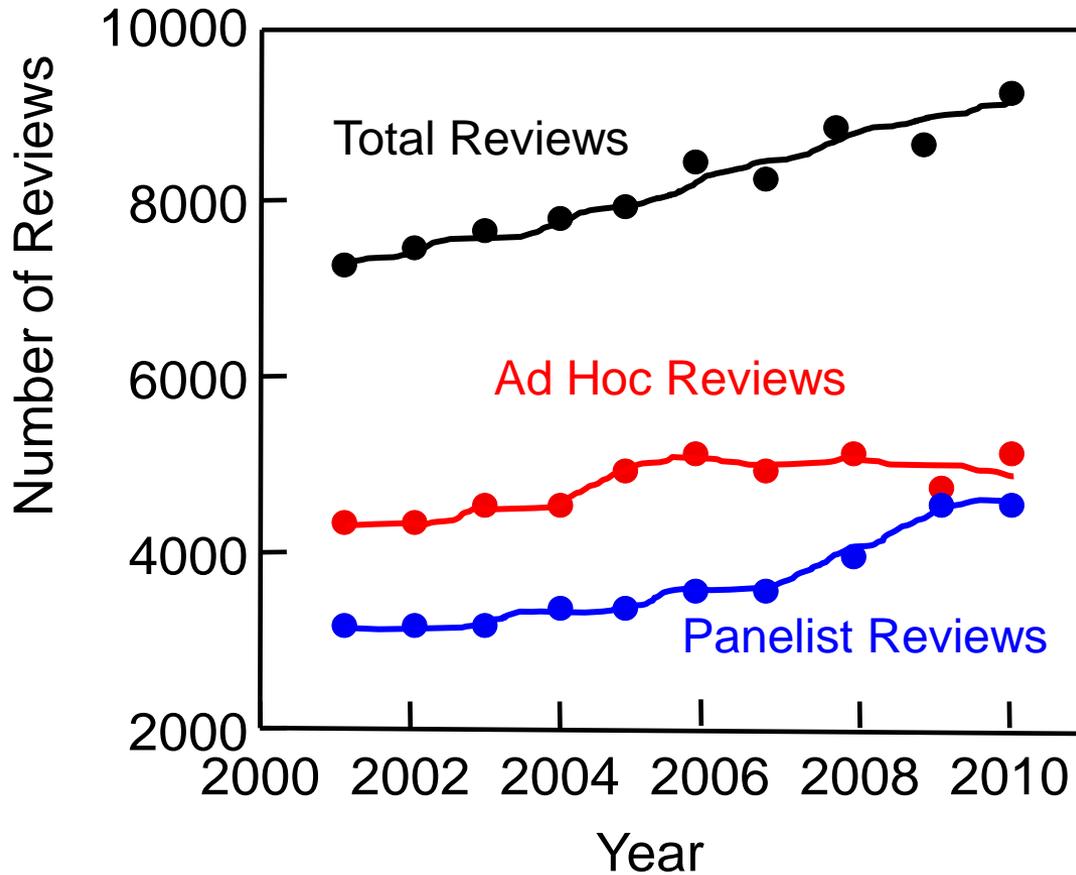
## Why Were Changes Made?

- **At NSF**
  - Increasing proposal numbers
  - Decreasing success rates
  - Increasing workload
  - Difficulty recruiting adequate panel and *ad hoc* reviewers
- **In the Community**
  - PIs are writing more proposals (institutional pressure)
  - Reviewers are being asked for increasing numbers of mail and panel reviews

# IOS Proposal Submissions and Awards



# Burden on the IOS Reviewer Community



# FY 2012 IOS Core Program Solicitation

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- **IOS Solicitation: [NSF 11-572](#)**
- **Frequently Asked Questions: [NSF 11-079 Webinar](#)**
- **Changes:**
  - Preliminary proposal deadline in January
  - Binding Invite/Do Not Invite decision
  - Full proposal deadline in August
  - Funding decision in December
  - Limit of two pre-proposals per PI as PI/co-PI

# Impacts on IOS Workload and Workflow

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- **The workload was higher in the first six months and lower in the last six months of the year but more manageable overall**
- **The changes promoted adoption of standard operating procedures and templates across IOS**
- **The new workflow provided opportunities for IOS staff to learn new skills**
- **Free time was created to allow planning activities**

**We worked smarter!**

# Community Benefits

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- **For PIs**
  - **Shorter format so less time invested**
  - **Still received feedback early on**
  - **Better “odds” for full proposals**
  - **Fewer requests for reviews as only full proposals were *ad hoc* reviewed**
- **For Institutions**
  - **No budget preparation for pre-proposals**

# Community Concerns

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- **Reduction in opportunities to apply for funding**
- **Potential for increased time to award**
- **Proposals were too short for adequate evaluation**
- **Overall review quality was diminished**
- **Negative impacts on Beginning Investigators**
- **Negative impacts on RUIs**

# Reduced Funding Opportunities?

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- **~80% of PIs used to submit only once a year with the old system**
- **2 pre-proposals were allowed (PI or co-PI) with new system**
- **Other Opportunities were available**
  - **ICOB, EAGERS, RAPIDS, other solicitations**
  - **Beginning Investigators had additional opportunities through the CAREER program**
- ***Additional data on potential impacts to time to award are still being gathered and analyzed***

# Participation

Division	Panelists	Respondents	Participation Rate
IOS	343	241	70%
DEB	229	189	83%
Total	572	430	75%

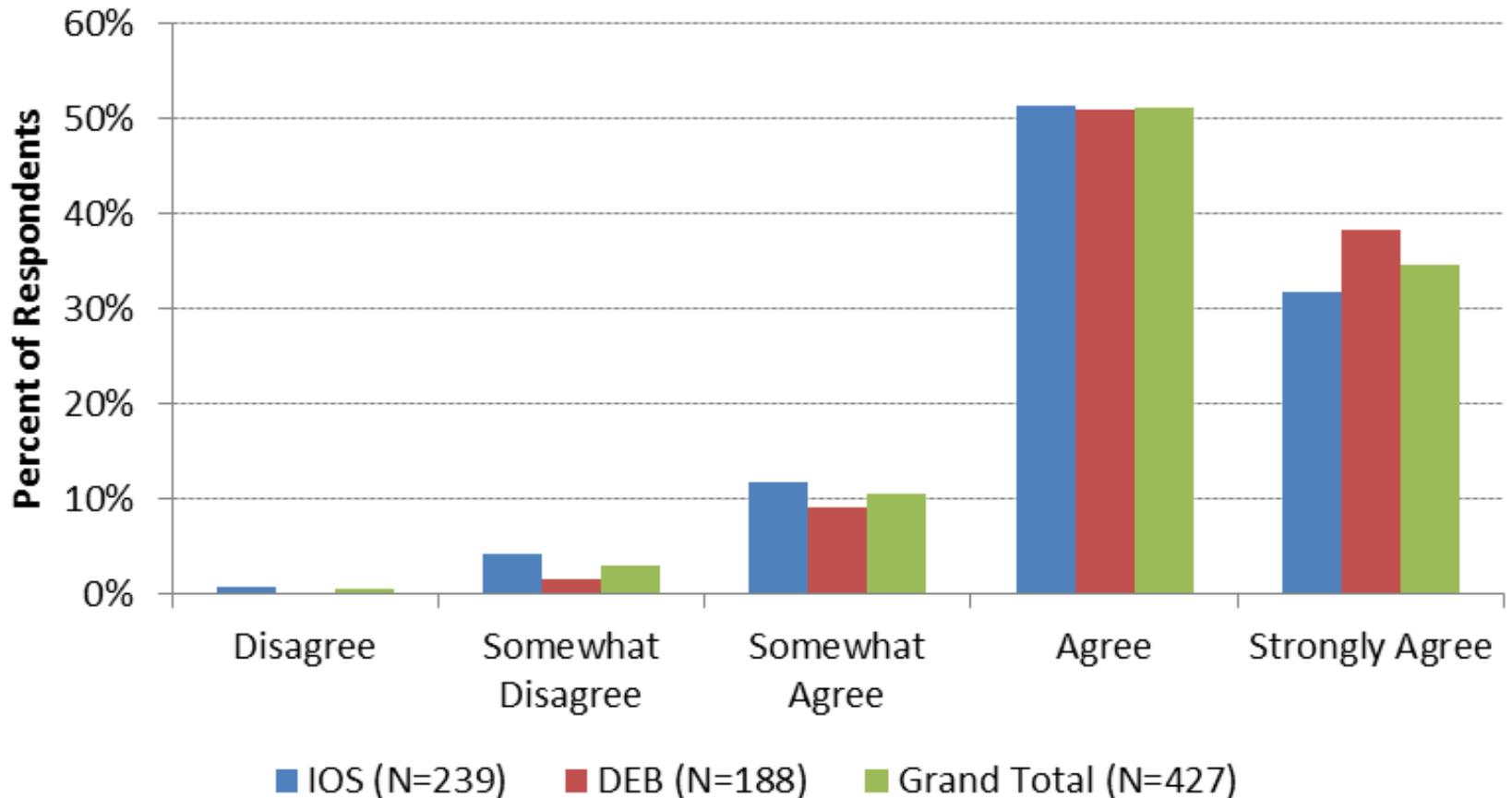
Division	In-Person Respondents	Virtual Respondents	Total Respondents
IOS	184 (76%)	57 (24%)	241
DEB	188 (99%)	1 (1%)	189
Total	372 (87%)	58 (13%)	430

**All figures based on respondents as of April 12, 2013, Noon**

**All data preliminary from Spring 2013 Pre-Proposal Panels - ONGOING**

# Content Adequate

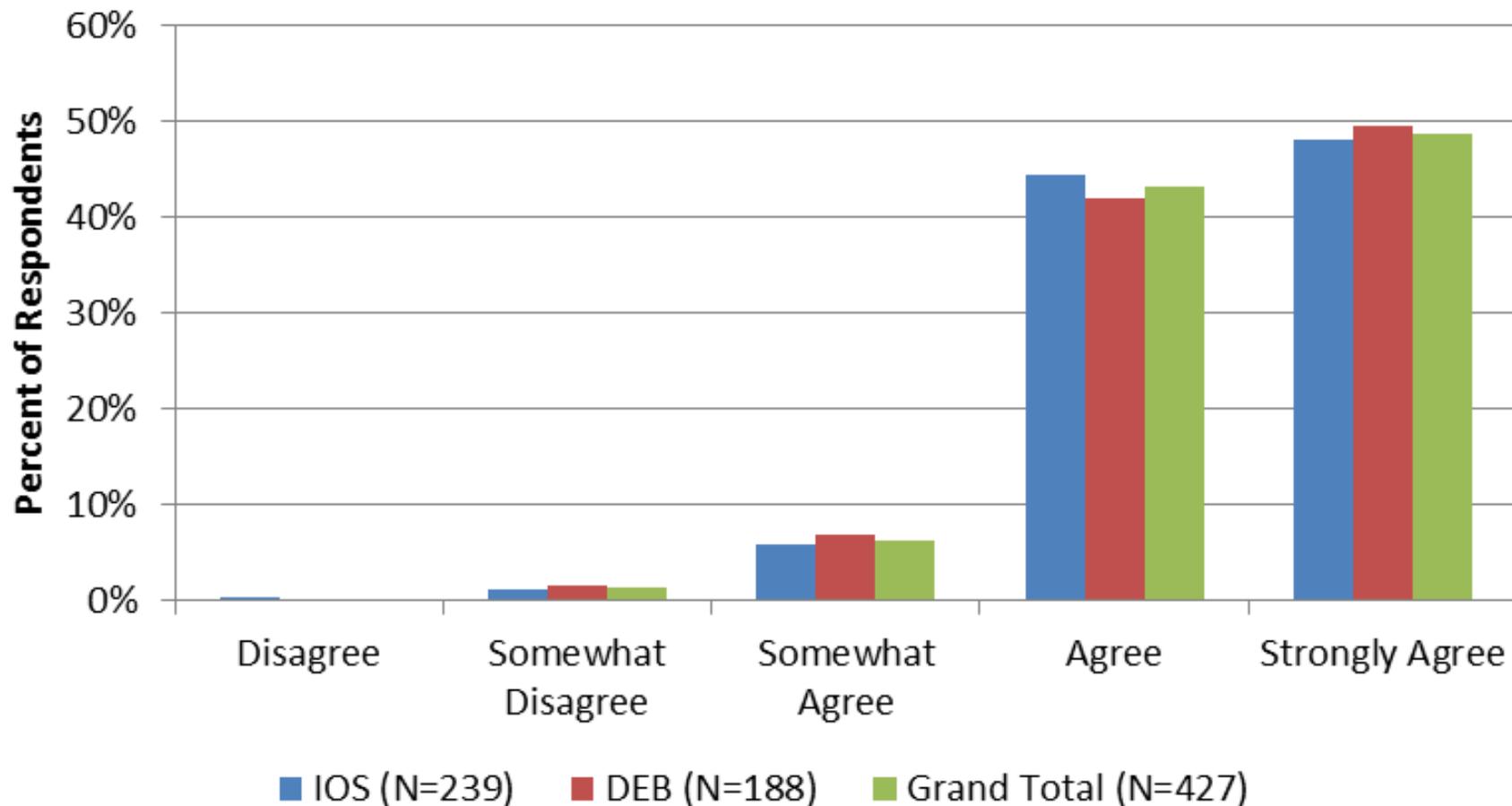
I found the content provided by these preliminary proposals to be adequate for evaluation under the merit review criteria.



All data preliminary from Spring 2013 Pre-Proposal Panels - ONGOING

# Feedback to PIs

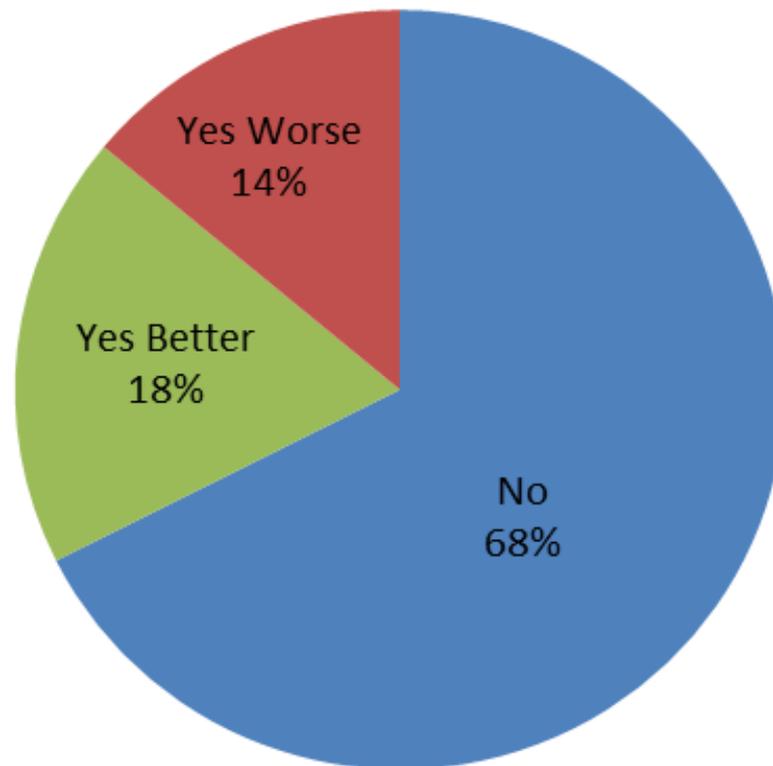
I believe I was able to provide useful feedback to PIs through my reviews and our panel summaries.



All data preliminary from Spring 2013 Pre-Proposal Panels - ONGOING

# Feedback to PIs

Did you notice a change in the quality of reviews and panel summaries prepared by this panel?  
(from pre-2012 full proposal panels)

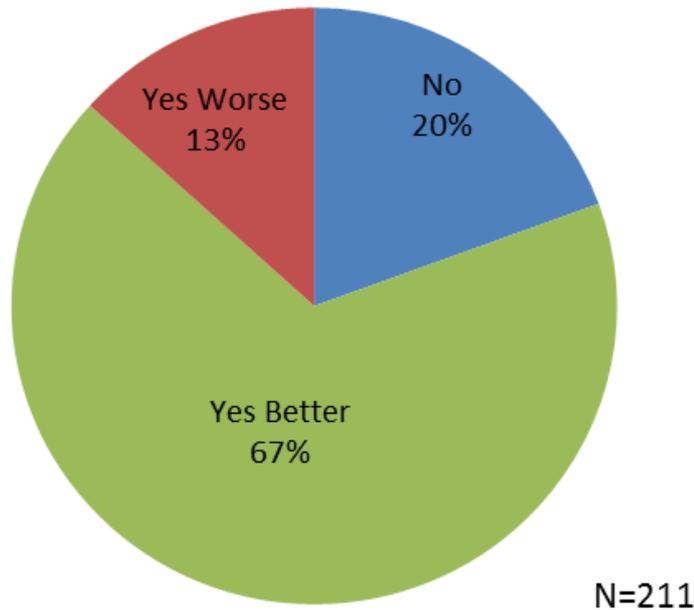


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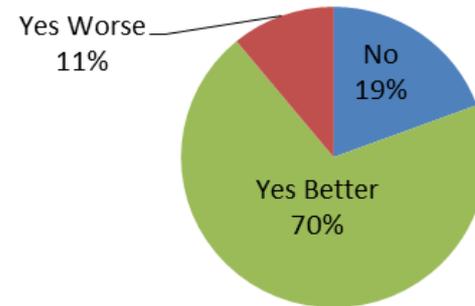
All data preliminary from Spring 2013 Pre-Proposal Panels - ONGOING

# Change in Reviewing Experience

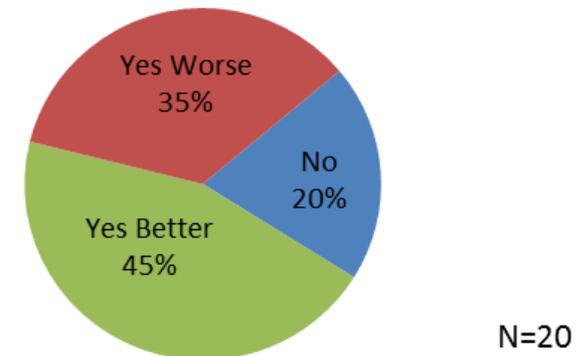
Did you notice a change in reviewing experience?  
(from pre-2012 full proposal panels)



In-Person: Did you notice a change in reviewing experience?  
(from pre-2012 full proposal panels)

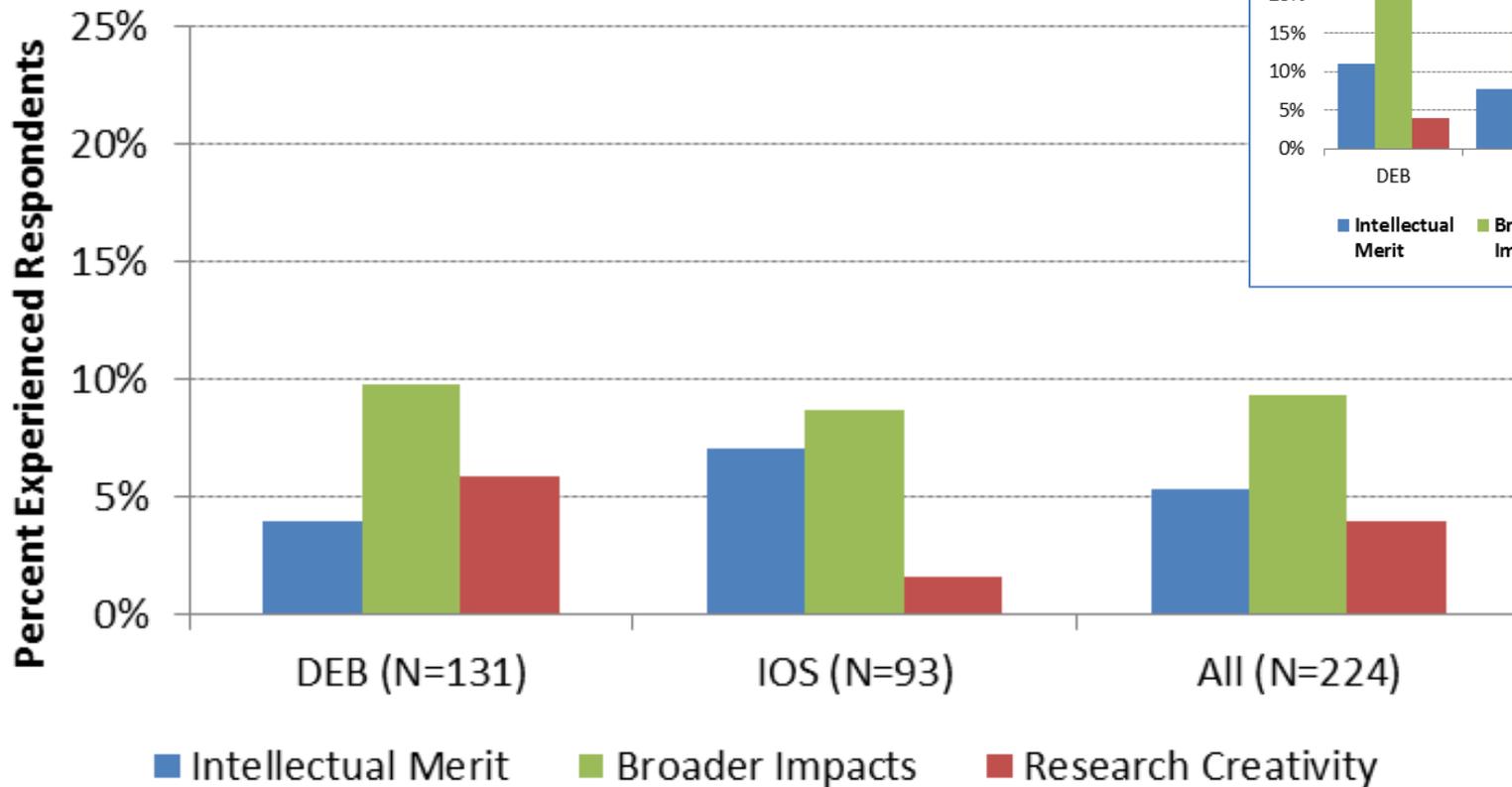


Virtual: Did you notice a change in reviewing experience?  
(from pre-2012 full proposal panels)

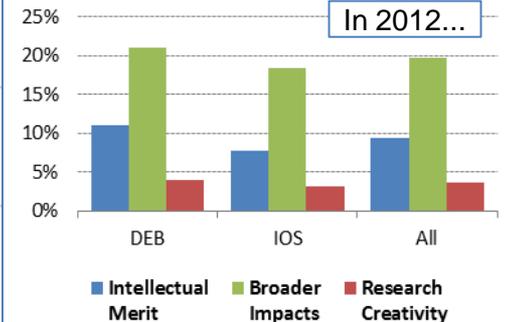


# Quality of Proposed Research

## Panelists Rating a "Change for the Worse"



## Q7-9. Panelists Rating a "Change for the Worse"



All data preliminary from Spring 2013 Pre-Proposal Panels - ONGOING

# How Are Beginning Investigators Performing Under The New System?

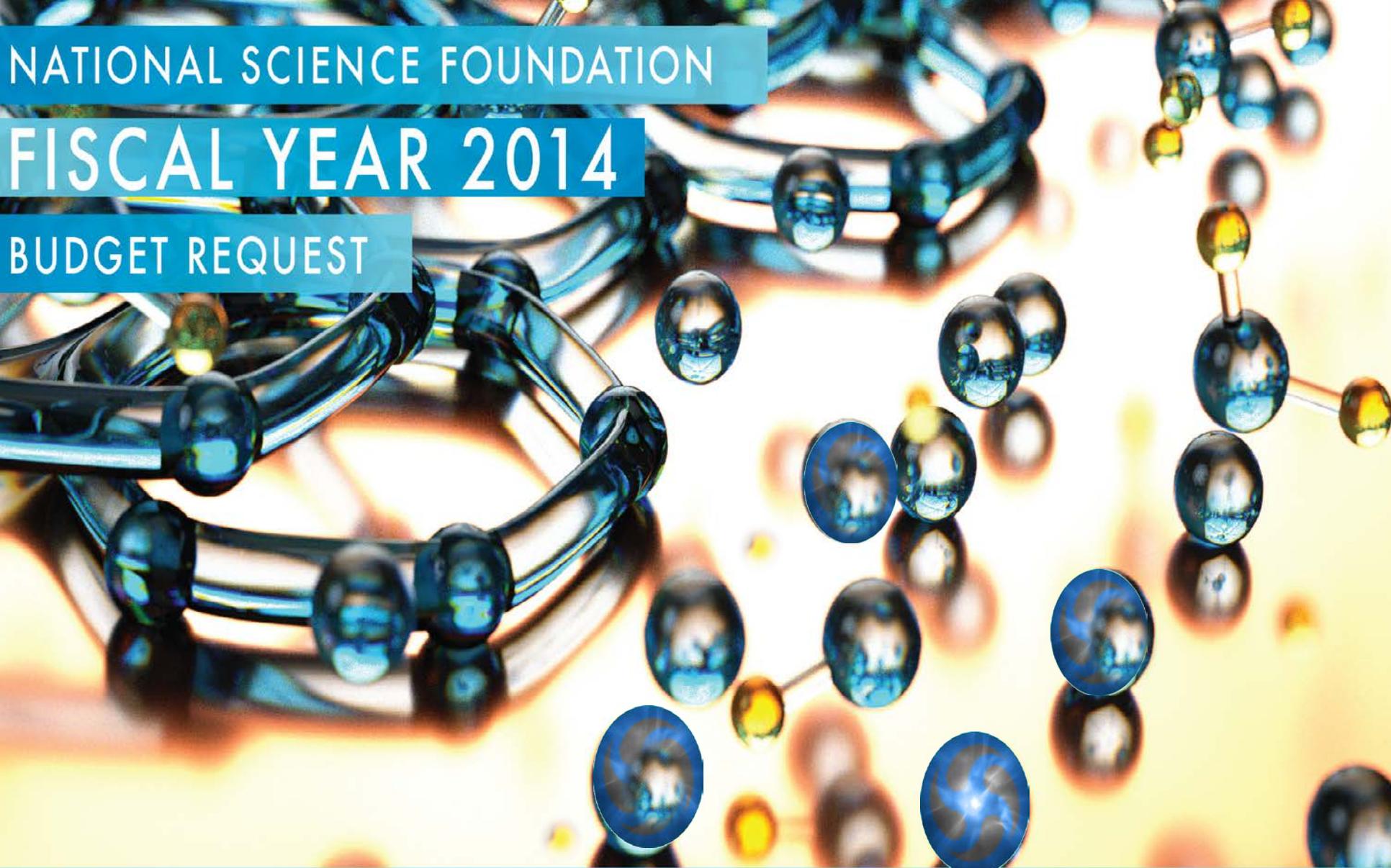
Since we do not yet have award information for the first round, we compared the percentages of proposals the panels ranked as “High Priority” from Beginning Investigators between the old and new review systems.

	<b>Fiscal Year</b>	<b>% of High Priority Proposals from BIs</b>	<b>% of Proposals Submitted by BIs</b>
<b>Old System</b>	2009	17.80	24.28
	2010	16.67	23.39
	2011	16.56	23.79
	2012	15.15	22.99
<b>New System</b>	2012 pre proposals	15.42	24.89
	2013 full proposals	16.67	22.33

# How Are RUI Investigators Performing Under The New System?

Here we compared the percentages of proposals the panels ranked as “High Priority” from RUI Investigators between the old and new review systems.

	Fiscal Year	% of High Priority Proposals from RUI Investigators	% of Proposals Submitted by RUI Investigators
Old System	2009	3.41	3.38
	2010	2.01	2.69
	2011	3.83	5.13
New System	2012 pre proposals	5.47	8.39
	2013 full proposals	6.79	8.65



NATIONAL SCIENCE FOUNDATION

FISCAL YEAR 2014

BUDGET REQUEST



Dr. John C. Wingfield  
Assistant Director

# NSF FY 2014 Budget Request

## NSF FY 2014 Budget

**TOTAL: \$7.625 billion**

**Increase: \$592 million**

**8.4% over FY 2012  
enacted**



# BIO FY 2014 Budget Request

*“Achieving a coherent understanding of the complex biological web of interactions that is life is a major challenge of the future”*

**TOTAL, BIO R&RA: \$760.58 million, +6.8%**

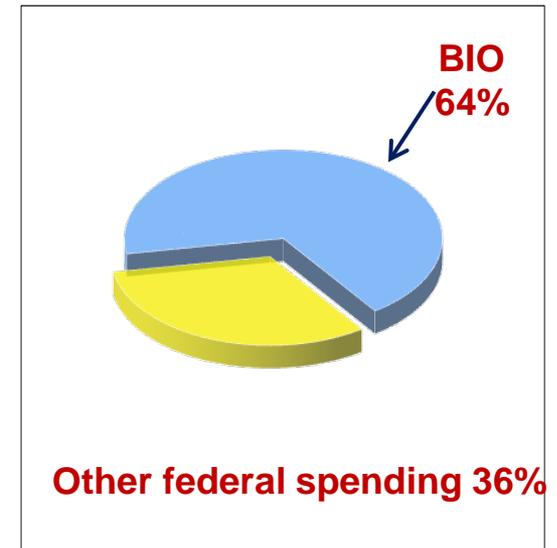
**Research: \$589 million**

**Learning: \$32 million**

**Infrastructure: \$126 million**

**Administration: \$13 million**

**NEON Construction: \$90.3 Million**



# BIO FY 2014 Budget Request

## Biological Sciences Funding (Dollars in Millions)

	FY 2012 Actual	FY 2012 Enacted/ Annualized FY 2013 CR	FY 2014 Request	Change over FY 2012 Enacted	
				Amount	Percent
Molecular and Cellular Biosciences (MCB)	\$125.63	\$125.79	\$136.39	\$10.60	8.4%
Integrative Organismal Systems (IOS)	212.43	212.33	225.37	13.04	6.1%
Environmental Biology (DEB)	142.55	142.56	148.97	6.41	4.5%
Biological Infrastructure (DBI)	126.46	126.18	133.65	7.47	5.9%
Emerging Frontiers (EF)	105.22	105.52	116.20	10.68	10.1%
<b>Total, BIO</b>	<b>\$712.28</b>	<b>\$712.38</b>	<b>\$760.58</b>	<b>\$48.20</b>	<b>6.8%</b>

Totals may not add due to rounding.

# Major Investments Table

## BIO Major Investments

(Dollars in Millions)

Area of Investment	FY 2012 Actual	FY 2012 Enacted/ Annualized FY 2013 CR	FY 2014 Request	Change over FY 2012 Enacted	
				Amount	Percent
BioMaPS	\$8.95	\$9.00	\$27.07	\$18.07	200.8%
CAREER	35.90	31.13	33.75	2.62	8.4%
CIF21	2.0	2.0	6.50	4.50	225.0%
SEES	27.25	27.25	35.75	8.50	31.2%
Neuroscience			5.00	5.00	N/A

# Strategic Integration for the Biological Sciences (SIBS)

## Knowledge infrastructure:

legacy of life sciences information

Digitization

Genomics and other omics data

Cyber-infrastructure

## Environmental infrastructure:

NEON

Field stations, marine labs and natural reserves

Networks of ecological observatory networks

Cyber-infrastructure

## Human resources infrastructure:

Undergraduate education (CAUSE)

Graduate education and postdoctoral fellows

Broadening participation, Citizen science

Workload mitigation – preproposals etc.

Open access

Cyber-infrastructure

# Emerging New Areas in BIO and Across the Foundation

## Global Food Security

PCAST report on agriculture

Water

Plant genome research program, BREAD, Physiological/  
structural systems

Responding to perturbations of the environment

SEES

Collaborative (BIO with ENG, GEO, MPS, SBE, CISE, EHR, OISE)

## MacroSystems Biology, “Fixing the Planet”

NEON science

Collaborative (BIO with ENG, GEO, MPS, SBE, CISE, EHR, OISE)

**Thank you to all the personnel  
of BIO, Program Officers and  
Administrative Staff.**

**Questions?**