

Subcommittee Collaboration

Goals:

- Develop proposal submission metrics to monitor the impact of no-deadline mechanisms– with focus on collaboration and new investigators
- Review metrics for signs of impact

Process:

- Subcommittee offered ideas on metrics of special concern
- Determine what is feasible within NSF data systems
- Test metrics *in vivo* against subcommittee's expectations
- Review FY18 & FY19 metrics for impact with subcommittee (April 1st Meeting)

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Talking Points

- **Dr. Beltz spoke to the history of the project and its relation to the goals on the slide.**
 - This activity stemmed from the move to a no deadline mechanism in BIO, and an interest in understanding that move and potentially other policy and procedural changes' impact on submissions to BIO.
- **Dr. Beltz spoke to the process taken, the nature of the collaboration between NSF and the AC subcommittee and introduced the subcommittee members.**
 - **Subcommittee Members**
 - Dr. Barbara Beltz, Wellesley, AC Liaison
 - Richard Kuhn, Purdue University, AC Member
 - Brent Miller, BIO Office of the Assistant Director, NSF
 - Ranajeet Ghose, City College of New York
 - Allyson Hindle, University of Nevada, Las Vegas
 - Kent Holsinger, University of Connecticut
 - Rob Last, Michigan State University

- Emily Sessa, University of Florida
 - Jonathan Stillman, San Francisco State University
 - Takita Sumter, Winthrop University
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- **Dr. Beltz commented that, overall, the subcommittee was happy with the collaboration with BIO.**

Final Products

- **Four categories of Metrics**
 - Proposal Submission Statistics
 - Proposal Numbers
 - Collaboration levels*
 - PI demographics
 - Gender
 - Race
 - Ethnicity
 - Career Stage*
 - Institution Demographics
 - Carnegie Classification*
 - Merit Review Outcomes
 - Funding Rate & Award Size
 - Reviewer Ratings
 - Decision Time*
- **Standardized Directorate level metrics for outreach activities**
- **Real-time monitoring of proposal submissions to BIO**

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- **NOTE** - Dr. Joanne Tornow presented the funding rate metrics as part of her presentation – it is included here (slide 6) for completeness.
- **Dr. Beltz introduced the Four Categories of Metrics and spoke to the process undertaken by the AC subcommittee:**
 - On **April 1st** the subcommittee reviewed each of the metrics in the four categories at the director level:
 - The subcommittee was pleased with the depth of the analysis – NSF has the capability to resolve these metrics to the program level
 - The subcommittee was pleased to hear that BIO will monitor each of these metrics annually – and some of them in real-time via a dashboard application
 - The subcommittee agreed with BIO’s assessment that there was no evidence that “no-deadline” mechanisms had an adverse impact on any metrics mentioned in the charge i.e., collaboration levels or new investigators
 - The subcommittee agreed that impact was observed in three

metrics:

- A decrease in proposal submission numbers
- An increase in funding rates
- A potential decrease in the time to reach final decisions on proposals
- The subcommittee agreed with BIO's view of three diversity metrics – gender, race, and ethnicity
 - The metrics showed no evidence of impact by moving to “no-deadline” mechanisms
 - The metrics did show a high, and potentially increasing, number of individuals who do not designate in these categories. The subcommittee agreed that this characteristic of the data makes interpretation of these data difficult
 - Dr. Beltz stated that BIO will continue to track these metrics and take action to decrease this trend – potentially through messaging in outreach activities
- Dr. Beltz stated that due to the shortened meeting time, only one metric from each category will be shared with the full Advisory Committee to provide a sense of the metrics going forward.
- **Standardized Directorate level metrics for outreach activities:**
 - Dr. Beltz stated that the subcommittee agrees with BIO's plan to provide program officers these metrics at the directorate level for use in outreach activities.
 - The subcommittee agreed that, with any metric, it is important to provide the appropriate context and interpretation and BIO believes this is the best way to present this data to the community.
- **Real-time monitoring of submissions of proposals to BIO**
 - Dr. Beltz stated that the subcommittee was pleased to see that BIO, in collaboration with the Office of Integrative Activities at NSF, developed a dashboard that allows access to a broad range of proposal information.
 - Dr. Beltz stated that this ability is now available to everyone in BIO and can be used to monitor submissions and several of these metrics down to the program level.
 - This tool is only for internal exploration and monitoring of the portfolio and not for external reporting.

Big Picture Moving Forward

What BIO envisions each year...

- Create a set of proposals from previous year's activity – BIO's Basic Research Dataset (BRDS)
- Use BRDS to calculate a standard set of metrics
- Use metrics to track consequences of policy & procedural changes
- Directorate level statistics will be available to program officers for outreach use
- In-depth – division and program level – statistics will inform NSF/BIO decisions

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Dr. Brent Miller continued the presentation of the data and metrics.

Dr. Miller presented the overall plan that BIO will proceed with.

Dr. Miller stated that BIO's intention is to make much of the directorate level statistics available for outreach through program officers' normal activities.

Dr. Miller stated that the subcommittee recommended BIO should keep an eye on division and program level statistics for substantive changes from year to year.

The Basic Research Dataset (BRDS)

Full Research Proposals

- All externally reviewed
- Covers MCB DEB IOS and DBI portfolios
- Broad funding level representation
- Represents a breadth of proposal types
- Includes core and special programs



Internally Reviewed Proposals and Other Actions

- (RAPID) Rapid Response Research
- (EAGER) Early-Concept Grants for Exploratory Research
- (RAISE) Research Advanced by Interdisciplinary Science and Engineering
- Workshop/Conferences
- Special Creativity Extensions, etc..
- Supplements, PI transfers, etc.....



Proposals not included in analysis

- Fellowships
- Dissertation research
- Ideas Labs

- This is the BRDS dataset
 - ✓ FY18
 - ✓ 77.5% of all FY18 submissions
 - ✓ 97.6% deadline driven
 - ✓ FY19
 - ✓ 59.3% of all FY19 Submissions
 - ✓ 56.1% deadline driven
- We are monitoring these live now!
- DBI Human Resources will be analyzed separately

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Dr. Miller continued the presentation of the data and metrics.

Dr. Miller explained that this slide is a brief explanation of the dataset that was used for the analysis – The BASIC RESEARCH DATASET (BRDS).

Dr. Miller described that the green box represents what is in the BRDS dataset, he noted that the key difference between what is INCLUDED and what is EXCLUDED – INCLUDED proposals have gone through external review; this characteristic makes for more consistent comparisons between years. He stated that the bullets in the box provide a few general characteristics of the BRDS set.

Dr. Miller walked through the bullets to the right of the green box to provide some basic statistics on the BRDS set:

- In FY18 – this set represents roughly 78% of all FY18 submissions – the remaining percent is largely represented as internally reviewed proposals and other proposal actions; he stated that these items are represented in the green hashed box.
- In FY 18 – roughly 98% of the BRDS set are proposals that came in via deadline mechanisms

- The same measures are given for FY19 – Dr. Miller noted that the key point is that in FY19 roughly 56% of proposals in the set were deadline driven and BIO expects this proportion to remain relatively constant in the years to come.
- **An important note** – the data represents two full years of data, but we are unsure what the natural year to year fluctuations are in these kinds of data. As time moves on, we will have a better understanding of what a “significant” change means.

Dr. Miller stated that the green hashed box represent what is EXCLUDED from BRDS, and explained that it generally includes:

- Internally Reviewed: EAGERS, RAPIDS, RAISES
- Workshops etc., PI Transfers, Supplements, Undistributed Panel/IPA Funds
- Withdrawn, Returned without Review, Preliminary Proposals, and Forward Fund among other things.

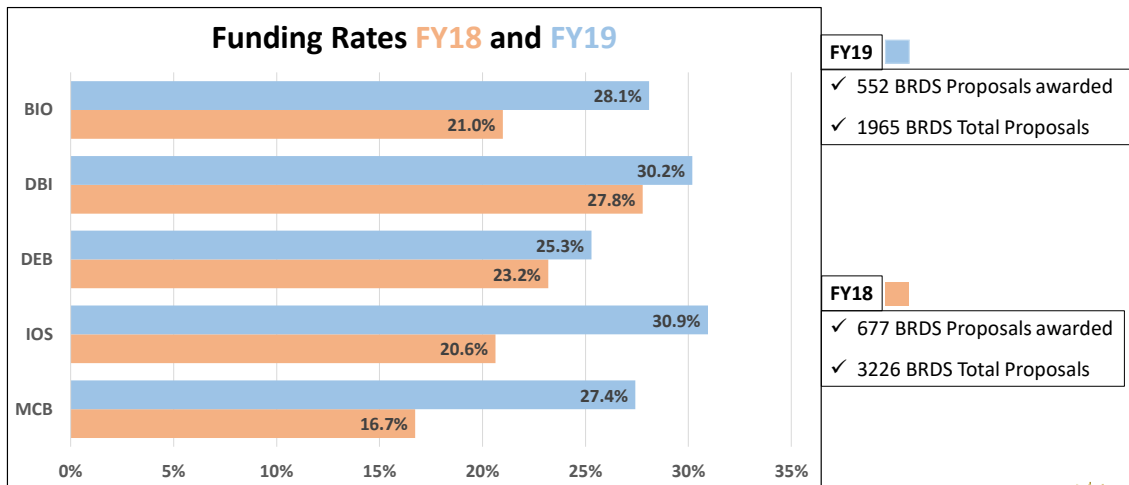
Dr. Miller stated that BIO can now monitor many of the EXCLUDED items in the green hashed box in real-time using the dashboard app that Dr. Beltz mentioned.

Dr. Miller stated that the solid red box represents other types of proposals that BIO is interested in tracking, especially surrounding human resource associated proposals. He stated that this includes:

- Training Proposals: Fellowships etc., Research Experience for Undergraduate Grants (REUs), Traineeships, or special funding mechanisms like “Ideas Labs”
- Special human resources associated proposals and special mechanisms (like Ideas Labs); he stated these will be analyzed separately.

END

Did funding rates change between FY18 and FY19?



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NOTE - This slide was presented by Dr. Joanne Tornow's Directorate Update presentation, but it is included here for consistency.

This graphic represents BIO's funding rate – along with each of the divisions' funding rates.

NOTE – This data is based on proposals, which include single and multi-jacket (a.k.a. collaborative) proposals

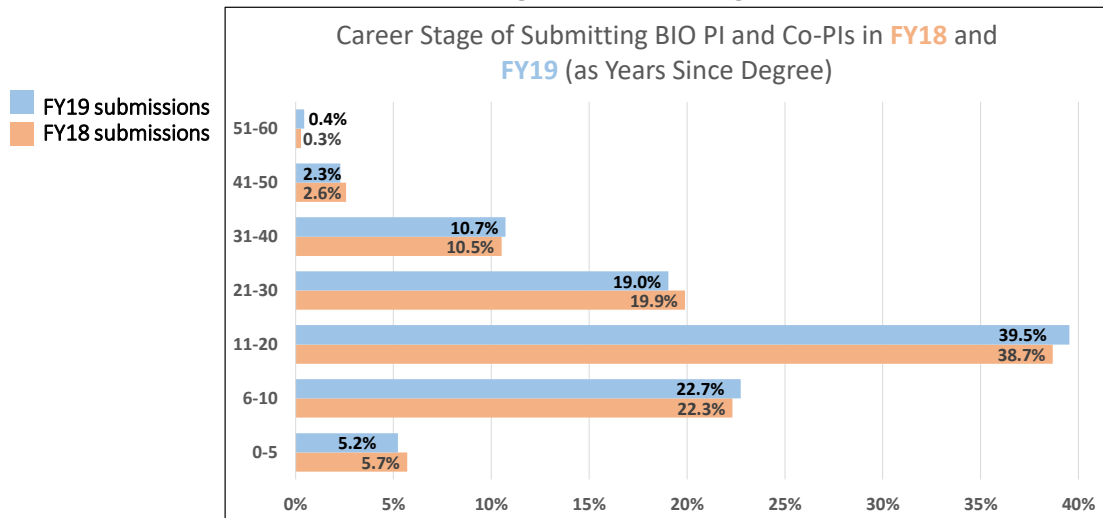
The take home messages Dr. Miller stated:

- The overall BIO proposal funding rate was greater in FY19 compared to FY18, despite fewer proposals being funded in FY19 compared to FY18.
- Higher overall BIO funding rate is mostly driven by increased success rates in IOS and MCB.

SAMPLE GRAPH TRANSLATION: In FY19, ~28% (552 of 1965) of proposals were awarded.

END

What is the distribution of investigator career stages on BRDS submissions?



FY19: PI & Co-PIs = 3886 which is lower than the total number of individuals (4576) due to insufficient reporting
FY18: PI & Co-PIs = 6160 which is lower than the total number of individuals (6981) due to insufficient reporting

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Dr. Miller explained that this slide represents the distribution of investigator career stages for PIs and CO-PIs as listed on the cover pages of proposals.

Dr. Miller stated that this represents submission data, and BIO has a similar representation for awards and the pattern is very similar to what you see here.

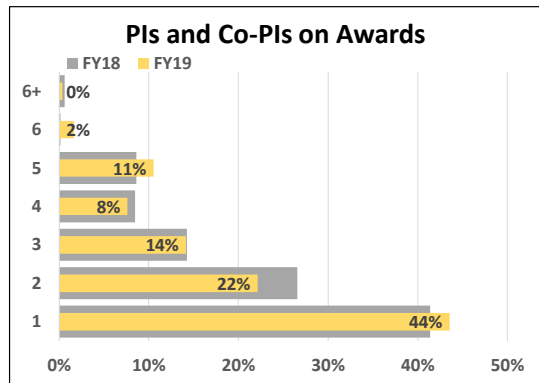
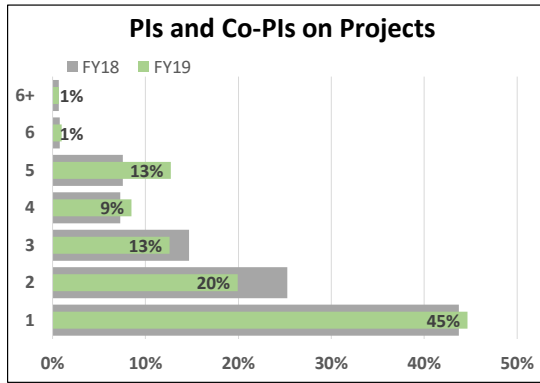
Dr. Miller explained that, at the request of the subcommittee, BIO split the “early career” stage into 0-5 and 6-10 years since degree populations.

The take home messages Dr. Miller stated were:

- Career stage distributions are similar for FY18 & FY19 submissions and that this suggests no evidence of concerning impact from the move to no-deadlines on this metric.
- A significant number of Co-PIs on cover pages do not report a year of highest degree – i.e., they left the space blank. This is something that BIO is going to keep an eye on and work on messaging to increase these numbers.

END

What is the level of collaboration on BRDS Proposals?



	FY18	FY19
Total Proposals	3224	1964

	FY18	FY19
Total Awarded Proposals	674	551

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Dr. Miller stated that the subcommittee was also concerned about the levels of collaboration on proposals. He explained that this figure represents the distribution of - the number of investigators - on proposals.

Dr. Miller explained that both the submissions (in Green on the left) and on awards (in yellow on the right) had very similar distributions. For clarity he explained that the bottom green bar; in FY19, 45% of 1964 proposals submitted to BIO had one investigator – i.e., no collaboration. Dr. Miller explained that this is important because for this analysis collaboration is defined as at least one Co-PI on a submission

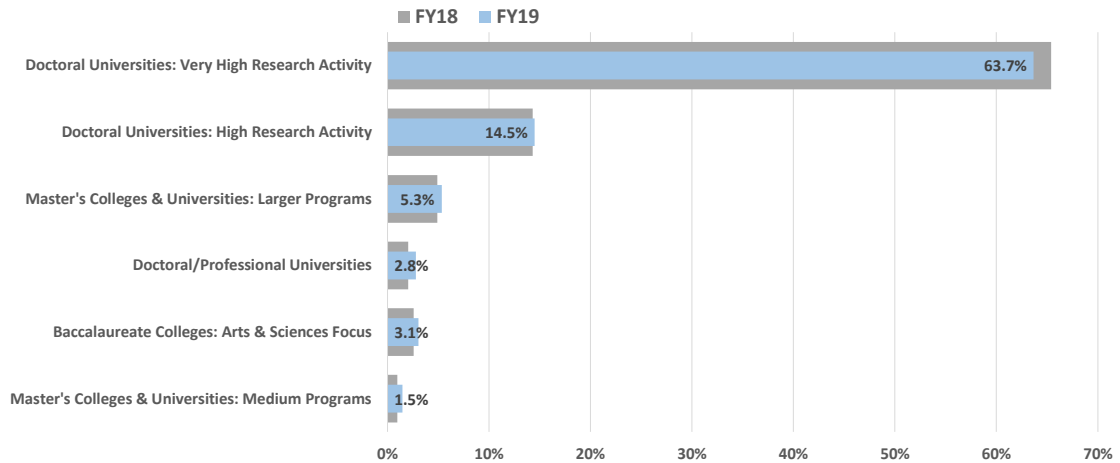
The take home messages Dr. Miller stated were:

- The distribution of the number of investigators on proposals is similar for both submissions and awards.
- Within the caveat of not knowing what the normal fluctuations in these measure are – BIO believes the levels of collaboration seem to be generally unaffected by our switch to no-deadline submissions.

END

What is the Carnegie institution type distribution among BIO BRDS proposal submissions?

Carnegie Institution Types of Submitted BRDS "Lead" Proposals in FY18 and FY19



✓ FY18: 3226 BRDS PI Institutions, ~90% of BRDS proposal submissions

✓ FY19: 1964 BRDS PI Institutions, ~91% of BRDS Proposal Submissions



Dr. Miller explained that the impact of policy changes on institution type was also of interest to the subcommittee – this graph represents the distribution of “Lead” institution types by Carnegie Classification

Dr. Miller noted that the fundamental unit counted is the Principal Investigator’s institution on a proposal; Co-PI institutions are NOT counted, and the “Lead” refers to the managing institution on the proposal.

Dr. Miller noted that this represents submissions, and the award data is very similar to this distribution.

In FY18, 90% of BRDS submissions are represented in the slide’s six categories.

- The graph you’re looking at excludes the non-Carnegie classified category (~7% of total submissions) which includes:
 - Not-for-Profit Organizations (e.g., museums, professional societies, arboretums, hospitals, conservation organizations, etc.)
 - Government
 - State Government
- The remaining 3% of institutions are in Carnegie BASIC categories with less

than 1.0% of the total proposal population; these are not shown on the slide. We have this data and can monitor it.

In FY19, 91% of BRDS submissions are represented in the slide's six categories.

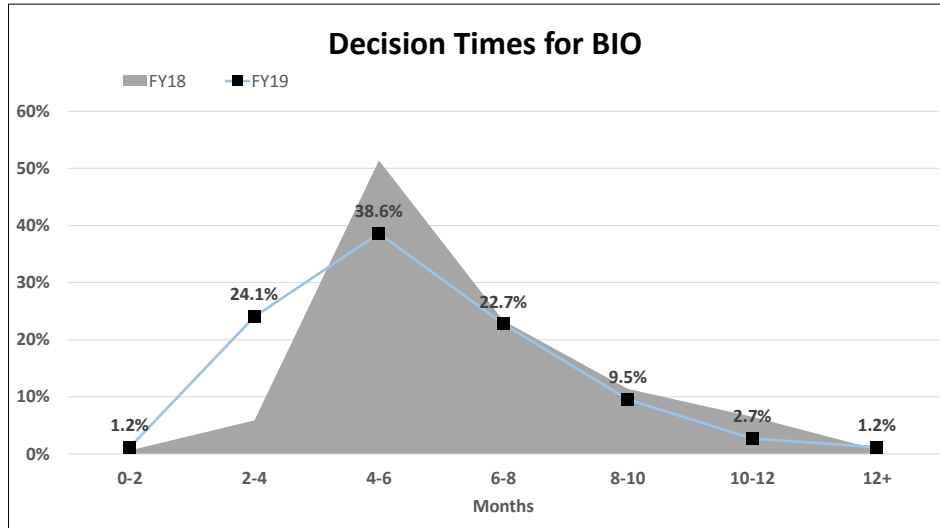
- The graph you're looking at excludes the non-Carnegie classified category (~7% of total submissions) which includes:
 - Not-for-Profit Organizations (e.g., museums, professional societies, arboretums, hospitals, conservation organizations, etc.)
 - Government
 - State Government
- The remaining 2% of institutions are in Carnegie BASIC categories with less than 1.5% of the total proposal population; these are not shown on the slide. We have this data and can monitor it.

The take home message Dr. Miller stated was:

- FY19 data follows the same distribution as FY18.
- No concerning difference between FY18 and FY19.

END

Distribution of decision time for BRDS submissions across BIO?



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Dr. Miller stated that the impact of policy changes on BIO's processes was also of interest to our subcommittee; one metric the group wanted BIO to track was the length of time to reach a decisions on proposals.

Dr. Miller stated that this graph represents the distribution of decision times for proposals in FY18 (in Grey) and FY19 (as the blue line)

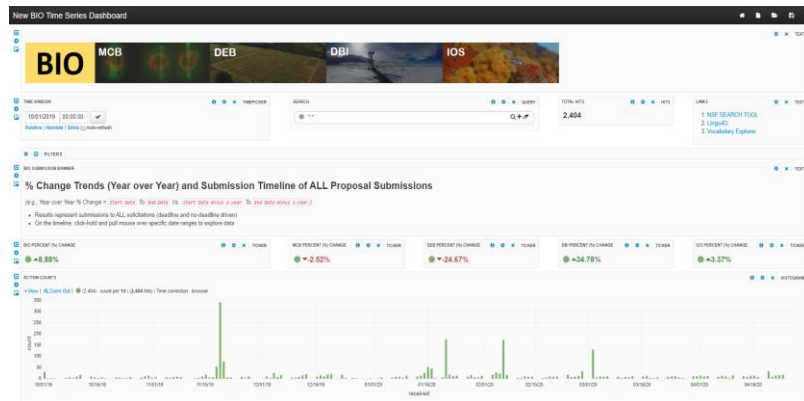
Dr. Miller stated that the "decision time" is defined as the time between the proposal's submission date and when an award/decline decision is concurred by a Division Director. This is a slightly different calculation than what is performed for the NSF Merit Review Report.

The take home message Dr. Miller stated was:

- There was a slight shift to shorter decision times in FY19

END

Real-time Dashboard for Proposal Submissions



Internally Reviewed Proposals and Other Actions

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- **(EAGER)** Early-Concept Grants for Exploratory Research
- **(RAISE)** Research Advanced by Interdisciplinary Science and Engineering
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- Supplements, PI transfers, etc.....

- ❖ Interactive tracking of all proposals
- ❖ Year-to-year comparisons over 10-years of data
- ❖ Accessible to everyone in BIO



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Dr. Miller presented the real-time dashboard BIO is using to track many of the internally reviewed proposal actions.

Dr. Miller stated that the light grey area on the slide represents a screen shot from the dashboard that BIO is currently using.

Dr. Miller included the Green Hashed Box (on the right) to remind the AC of the set of internally reviewed proposals and other proposal actions taken by BIO program officers.

Dr. Miller stated that the dashboard allows BIO to track these proposals from the time they enter the building to the time when a final decision is made – and these quantities are being updated daily. He stated that the dashboard was available to everyone in BIO for exploring the data and science portfolio.

Dr. Miller ended the presentation and answered questions.

END

- QUESTIONS?



Dr. Miller ended the presentation and asked for questions from the Advisory Committee members.