



Astrophysics  
Division

# **NASA Advisory Council Astrophysics Subcommittee: Research, Analysis and Enabling Technology Programs**

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# Research Program Review: Timeline

First telecon meeting 13 December 2010:  
Welcome, introductions and planning.

First in-person meeting 9 January 2011 in Seattle  
Presentations on Fermi Guest-Investigator program (Julie McEnery)  
and Origins of Solar Systems (Mario Perez; Don Terndrup from NSF)

Public comment session 12 January 2011

Interim report to ApS from panel chair Jay Gallagher, 16 February 2011

Meeting in the DC area: 24-25 March 2011

Presentations on Spitzer (Lisa Storrie-Lombardi), Hubble (Ken Sembach),  
Chandra (Belinda Wilkes & Martin Weisskopf) Guest Observer programs  
and from HQ discipline scientists on APRA, Astrophysics Theory, ADAP

Meeting in the DC area: 28-29 April 2011; writing the report; last-minute or  
forgotten items

Report due May 15, 2011



# The Review Charter: progress to date

Notes in blue are based on a draft by panel chair Jay Gallagher

This comparative review should assist NASA to increase the effectiveness of its Research, Analysis and Enabling Technology programs. The purpose of these programs is to maximize the scientific productivity from NASA's current and future missions, in the context of the science goals, objectives and research focus areas described in the Science Mission Directorate's Science Plan, and the Astro2010 Decadal Survey of Astronomy and Astrophysics. The review will use readily available data to assess the effectiveness of the programs.

*The panel notes that available data are not fully adequate to task, and will recommend collecting additional information to help inform future reviews.*



## Much discussion on the charge's final point...

Finally: this review should suggest appropriate program metrics, and a mechanism for future review of the Astrophysics Research, Analysis and Enabling Technology program. What data could most usefully be collected to assist future assessments of the program?

*This is a major area of focus: describing what is needed to allow future reviews of the content of the Astrophysics programs. One set of metrics will not be equally useful to all programs, and care will be needed in using metrics to set program criteria and in making assessments. For example, the number of papers is not a highly useful metric for technology development but matters for the Astrophysics Theory Program, where papers are THE immediate product.*

*The GO/GI programs all track publications, some track workforce development, all have user committees. Since a satellite may expire unexpectedly, these programs are tweaked year by year to do the most important science. For missions beyond their prime phase, the Guest Observer programs are reviewed every 2 years as part of the Senior Review. Thus GO programs devote considerable resources to tracking these metrics.*



## The Review Charter – 3

The Astrophysics Division funds analysis of data from its missions in two ways.

- The **Astrophysics Data Analysis Program (ADAP)** funds analysis and interpretation of data in the public archives of NASA missions, and of international space missions such as XMM, CoRoT and Herschel. Most are multi-year awards for investigations using data from multiple missions.
- Guest Observer (GO) awards are associated with specific operating missions; they fund analysis and interpretation of data from particular proposed observations. These are typically single-year awards, with funding released only when the observations are taken.

*The panel will note that GO missions have departed from this paradigm in order to optimize scientific return – an example of using success criteria to improve programs.*

What are the strengths and weaknesses of these two funding models, and what is the appropriate balance between them?

*The panel feels that ADAP and the GO programs are highly complementary. Some of the best practices in the mechanics of handling awards in GO programs should be examined for applicability to ADAP.*



## The Review Charter – 4

Is the **Astrophysics Theory Program** appropriately targeted to facilitate interpretation of results from current missions, and aid in developing concepts for future missions?

*The panel sees Theory as a key part of a long-range development process; successes in cosmological investigations are examples of missions stemming from theoretical foundations.*

- What are appropriate metrics to judge whether too large a fraction of the Astrophysics budget is spent on theory, or too little?

*The panel will address this under the general heading of metrics. The answer will depend on what constitutes a successful NASA ATP.*

- Is the range of award sizes suited to the range of theory challenges to be addressed?

*Again, better success criteria are needed to make the assessment.*

Does the **Astrophysics Research and Analysis (APRA) program**

- Balance appropriately between suborbital flight opportunities (both for science and for advancing technology) and the development of enabling technology and of detectors?

*Not discussed yet*



## The Review Charter – 5

Does the **APRA program**

- Make initial investments in technology that are appropriate to NASA's future strategic missions?

*This issue is receiving considerable attention: what technological (and workforce) capabilities are required for NASA space astronomy of the future?*

- Allow PIs to develop technology to the level of readiness required for an Explorer proposal?

*Under discussion in a general sense: developing both the PIs and the technology for future flight missions*

- Fund laboratory astrophysics in a way that optimizes interpretation of data from current and future space missions?

*The panel is considering what metrics might be developed to assess this, forming a basis for criteria that can support decisions in this and other areas in a dynamic way.*

- Offer a range of award sizes suited to meet the challenges in these areas?

*The panel is discussing award sizes and (perhaps more important) duration.*



## The Review Charter – 6

The **Origins of Solar Systems (OSS)** program is run jointly with Planetary Science; the Astrophysics element supports exoplanet detection, from space or from the ground.

- How should the OSS program change to complement NSF's role?  
*The approaches of NSF and NASA are independent, with overlaps in some areas. This arrangement of loose coordination appears to work well, and many panelists felt that it should be continued.*

- Should the OSS program be continued to foster interdisciplinary collaboration with Planetary Science?  
*The Panel sees this joint program as important, and may suggest additional cooperation on proposal review.*

*Extrasolar planets is an engaging area both for the public and the science community; thus it may represent a key area for building support for NASA Astrophysics.*



## The Review Charter – 7

The December 2009 Fisk Report “An Enabling Foundation for NASA’s Earth and Space Science Missions” notes (Box S.1) that Research and Analysis programs should enable a “healthy scientific and technical workforce” for NASA’s science missions

- When should this be a consideration in evaluating and selecting proposals?  
*Not discussed yet – on the agenda for the April meeting.*
- What metrics might be appropriate for the program’s effectiveness in this area?  
*This will be part of a more general discussion of metrics.*

The Fisk Report also points out the importance of funding research that presents high risks but offers high potential returns.

- What metrics might be appropriate for the program’s effectiveness in this area?  
*The panel’s current position is that this is an important area, noting that the Guest Observer programs set aside time for ‘large’ proposals that risk a major fraction of the observing time. The panel will consider what metrics might be used, noting that these must support the criteria by which the program is to be assessed as meeting its goals.*



## The Review Charter – 8

The review should also:

- Identify any options to add new proposal opportunities, or to remove existing opportunities.

*This depends on a vision for the future of NASA Astrophysics, which is still settling into place after the Decadal Survey.*

- Identify areas of Research, Analysis and Enabling Technology where NASA could fruitfully partner with NSF, DoE or other agencies.

*The panel has little useful information in this area; no discussion beyond OSS*

- Identify any ways in which we could improve the mechanics and quality of our reviews.

*The discussion with Guest Observer programs will lead to suggestions in this area.*



# Backups



# Panelists for Research Program Review

Jay Gallagher	U Wisconsin	Chair; spectroscopy, galaxies, journal editor
Sterl Phinney	Caltech	Co-Chair; theory, fundamental physics
John Blondin	N Carolina State U	theory, supernova remnants, X-rays
Steve Boggs	UC Berkeley	Balloon PI, gamma rays
Dennis Ebbets	Ball Aerospace, Colorado	UV spectroscopy, exoplanets
Miriam Forman	SUNY Stony Brook	particle acceleration: cosmic rays, solar wind
Tom Greene	NASA Ames	exoplanets
Mary Beth Kaiser	Johns Hopkins	Rocket PI, UV to near-IR astronomy
Tom Lored	Cornell	astrostatistics; Large Scale Synoptic Telescope
Amber Miller	Columbia	CMB science, microwave instrumentation
James Neff	College of Charleston	X-ray, UV, stellar coronae
Joseph Nuth	NASA Goddard	dust, molecules (planetary)
Howard Smith	Center for Astrophysics	infrared spectroscopy
Chris Walker	U Arizona	THz spectroscopy, interstellar gas, balloon PI