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July 14, 2015

Dr. Patricia M. Dehmer  
Acting Director  
Office of Science  
U.S. Department of Energy  
1000 Independence Avenue  
Washington, D.C. 20585

Dear Dr. Dehmer:

On behalf of the Basic Energy Sciences Advisory Committee (BESAC), I am forwarding to you the report of the 2015 Committee of Visitors (COV) for the Materials Sciences and Engineering Division. The COV met for three days in March 2015, to address the standing charge to BESAC to review annually one of three BES Divisions on a rotating basis. Professor Gary Rubloff of the University of Maryland chaired this committee.

I would like to take this opportunity to highlight four particularly important findings of the COV.

- Many past COVs have commented on the importance of moving to an electronic proposal processing/reviewing, management system. This COV (and BESAC) would now like to **commend** the Office of Science for the development and implementation of the PAMS system.
- The travel budget limitations are a severe impediment to the program officers carrying out their mission in a quality manner. BESAC was pleased to learn that a re-balancing of the Office of Science travel funds has provided BES with some relief in this area. We hope that this issue will continue to receive attention.
- The COV stressed the importance of the core research program as BES looks to address the "transformative opportunities" described in the new BESAC report.
- The COV stressed the importance of the development of effective "highlights" of the research activities supported by BES funding. It is also recognized that the development of truly effective "highlights" requires support from staff with special skills and who are trained in effective communication.

The recommendations of the COV and the contents of this report were unanimously accepted and endorsed by the members of BESAC at our July 2015 meeting.

I would like to thank you for the opportunity to involve BESAC in this very important review process.

Sincerely,

A handwritten signature in blue ink that reads "John C. Hemminger".

John C. Hemminger  
Professor of Chemistry  
Chair, BESAC

Enclosure

cc: Professor Gary Rubloff, University of Maryland  
Harriet Kung, SC-22  
Katie Runkles, SC-22

**Report of the Committee of Visitors**  
**Materials Sciences and Engineering Division**  
to the  
**Basic Energy Sciences Advisory Committee**

**Review of Fiscal Years 2012, 2013, 2014**

**Germantown, Maryland**

**March 10-12, 2015**

# Executive Summary

A Committee of Visitors (COV), under the guidance of the Basic Energy Sciences Advisory Committee (BESAC), reviewed the programs of the Materials Science and Engineering (MSE) Division within the Department of Energy (DOE), Office of Basic Energy Sciences (BES) for the fiscal years (FYs) 2012, 2013 and 2014. The COV was chaired by Prof. Gary Rubloff. Sixteen members of the committee met at the Germantown headquarters of BES on 10 March – 12 March, 2015.

The charge to the COV from Prof. John Hemminger, the chair of BESAC, was:

1. *For both the DOE laboratory projects and the university projects, assess the efficacy and quality of the processes used to:*

*(a) solicit, review, recommend, and document proposal actions and*

*(b) monitor active projects and program.*

2. *Within the boundaries defined by DOE missions and available funding, comment on:*

*(a) how the award process has addressed the EPSCoR program goals and*

*(b) how the Laboratory-Partnership program has taken advantage of the unique DOE laboratory assets.*

The format of the review was similar to that used in the prior COVs. The COV Panels reviewed the 3 programmatic teams within the MSE Division plus the DOE Experimental Program to Stimulate Competitive Research (EPSCoR) program.

The COV would like to commend all of the Division staff and program managers for their dedication and skill. The COV found that the processes by which DMSE operates are fair, efficient, and professionally implemented. The consequences are that the DMSE research portfolio is outstanding on a national and international scale.

The staff, program managers, and DMSE management are thanked for their help before and during this COV, and for the fantastic organization. They provided the COV with an insightful introductory overview, a highly organized process to review and assess documents, and timely responses to a myriad of questions raised by COV members, ensuring that the whole COV process was conducted in an efficient and productive manner.

The COV makes the following specific major recommendations:

- BESAC will soon release its update to the 2007 Grand Challenges report, which will include several transformative opportunities critical to both fundamental and use-inspired science. The COV believes that increased funding would be highly appropriate to address these, and that the core programs reviewed here can play a critical role in executing these opportunities.
- The COV's highest and most urgent priority is a substantial increase in travel funding for BES program managers, not only because of the precipitous drop in recent years, but because of the need to support the markedly broader scope of DMSE programs and missions – including EFRCs, Hubs, and Early Career awardees. For only a small fraction of the research budgets, increased travel funds for program managers ensure the success of awards and workforce development in the scientific community.

- We encourage continued use of the white paper process in the core programs. Every effort should be made to preserve the timely, informal, frank, detailed nature of guidance the program managers provide to PI's before and just after the white paper submissions. The evolving PAMS platform should not interrupt the interactive, individualized nature of feedback process now in place.
- The assembled research highlights – both ppt and web format – provide a valuable synopsis of the research portfolio and communicate its value to a broader audience across science and society. Describing and disseminating research advances as highlights should continue to be a high priority for both the PI's and the program managers. Support should be provided for the special skills mix required for BES to facilitate the development of effective research highlight writeups.
- The biennial meetings for PIs and program managers are very beneficial and should be continued.
- While growing and receding research emphases are shared with the community in several ways, the COV recommends systematizing this process. The website and individual FOAs are quite different but important venues, both appropriate to share areas of new emphasis and de-emphasis of topics within the context of a much broader portfolio.
- It is important to maintain a balance between the three EPSCoR funding modes: implementation grants, lab partnership grants, and early career awards. A strong portfolio has been built up in recent years for the implementation grants and Early Career awards. It is important now to reinvigorate the lab partnership part of the portfolio to take advantage of excellent capabilities and senior staff mentoring at the national laboratories to support development of early career scientists into future leading senior investigators.

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# 1. Introduction

This report documents the findings from a Committee of Visitors (COV) that was assembled under the auspices of the Basic Energy Sciences Advisory Committee (BESAC) to evaluate the processes and programs of the Division of Materials Sciences and Engineering (MSE) Division in the Office of Basic Energy Sciences (BES). The COV met at the Department of Energy facilities in Germantown, Maryland, for two and one-half days from March 10 - 12, 2015. This was the fifth in the series of COV reviews of the MSE Division; the first held in March 2003, with subsequent reviews in 2006, 2009 and 2012.

## 2. The Charge to the Committee of Visitors

The charge to the COV was established in a letter from the Chair of BESAC, Prof. John Hemminger, to Prof. Gary Rubloff, who had agreed to chair the COV. The letter is attached as Appendix I. The charge was to address the operations of the MSE Division during the fiscal years 2012, 2013, 2014. The components of the Division that the COV was asked to review were:

1. Scattering and Instrumentation Sciences Team (X-ray Scattering, Neutron Scattering, Electron and Scanning Probe Microscopy),
2. Materials Discovery, Design, and Synthesis Team (Materials Chemistry, Biomolecular Materials, Synthesis and Processing Science),
3. Condensed Matter and Materials Physics Team (Experimental Condensed Matter Physics, Theoretical Condensed Matter Physics, Mechanical Behavior and Radiation Effects, Physical Behavior of Materials), and
4. Experimental Program to Stimulate Competitive Research (EPSCoR).

The COV was asked to focus on the following major elements:

- (i) For both DOE laboratory projects (Field Work Programs, FWPs) and grants program, assess the efficacy and quality of the process used to solicit, review, recommend, and document proposal actions and to monitor active projects and programs.
- (ii) Within the boundaries defined by the DOE missions and available funding, comment on how the award process has affected the breadth and depth of portfolio elements, and the national and international standing of the portfolio elements.

## 3. The Committee Membership

The COV panel leads were selected by the COV chair, Dr. Gary Rubloff, in consultation with the chair of BESAC and the Division leadership. Panels lead were: Eric Stach (Scattering and Instrumentation Sciences), Pat Thiel (Materials Discovery, Design and Synthesis), Giulia Galli (Condensed Matter and Materials Physics), Tom Picraux (EPSCoR). Then the additional members of the COV were chosen, with input from the panel leads, to represent a cross-section of experts in scientific fields relevant to the activities supported by the MSE Division.

A balance was achieved between researchers who currently receive funding from BES and those that do not (8 and 7, respectively), between academic (12), national laboratory (2) and industrial researchers (1), between those that have previously served on a COV and those that have not (3 and 12, respectively), and also including representatives from EPSCoR states (3). Since quite a number of COV members have career histories spanning two or more domains (academia, industry, government), the numbers themselves do not fully convey the richness of perspective in the COV.

Given the size of the Division and the breadth of programmatic areas, a sizable committee was assembled. The COV consisted of a total of 15 members, plus the chair and were divided between 3 panels for the first reading of the grant/ FWP folders, and 4 panels for the second reading of the folders

(which included the read for the EPSCoR program). A full listing of the COV members and their panel assignments for both the first and second reading of the folders is given in Appendix II and Appendix III, respectively.

## **4. The Review Process**

The COV assembled in Germantown at 8:55 AM on Tuesday, March 10, and adjourned at 11:00 AM on Thursday, March 12. The agenda for the COV is attached as Appendix IV.

Prior to convening in Germantown, each COV member was supplied with the link to the MSE Division COV website that included a comprehensive set of information pertaining to: the COV process, the report template, the core research activities of the Division, the procedures used by BES in reviewing both university and national laboratory applications, and a copy of the 2009 and 2012 MSE Division COV reports together with the response from BES. This comprehensive documentation was found to be useful in setting the stage for the actual COV and enabled the panel members to be prepared for the COV. Additional information was also supplied to each member during the meeting of the COV. Each computer included copies of the plenary presentations, a more detailed overview of each of the Division's programs, and summary of the EPSCoR program.

The COV began with a reiteration of the charge from the BESAC chair, Prof. John Hemminger. This was followed by an overview of BES by Dr. Harriet Kung, the Director of BES, and overview of the MSE Division by the Dr. Linda Horton. The panel members were then presented with some details of the overall review process by the COV Chair, Prof. Gary Rubloff, before adjourning to their panel break-out rooms.

The first reading of the folders began with an overview of the Team programs by the MSE Division Team Lead and the respective program managers. Each panel was supplied with an electronic set of representative proposal folders to evaluate the MSE Division award/decline/monitor process.

For grants, these proposals were distributed among four types of programmatic decisions: easy awards, easy declines, difficult awards, and difficult declines, with a total of more than 30 proposals per panel, except for EPSCoR (more than 10). In general, the number of proposals reviewed reflected the budget and numbers of applications for the subprograms. The panels were free to request any additional materials (including folders for other projects) and information that they felt would help them in their evaluation process.

For laboratory-based field work proposals (FWPs), the panels reviewed laboratory triennial reviews for renewals of projects plus mail reviews for new projects. There were more than 30 FWPs available to review per panel, except for EPSCoR that funds only university research.

The first reading of folders occupied the remainder of the first day with the panels preparing preliminary conclusions. The COV chair and panel leads then met in executive session to consolidate their initial impressions, then shared these and some questions with the BES and Division management. Informal discussion and documentation continued into the evening. The template used by the panels for their reports is presented in Appendix V.

On the morning of the second day, the panel members were assigned to different panels for the second read. The panel leads, however, remained with their original assignment to add continuity and context for the COV members assigned to do the second reading of the folders. The second reading allowed refinement and review of the preliminary findings. Also on the second day, a fourth panel was assembled, led by Tom Picraux, Los Alamos National Laboratory, to conduct the first and only reading of the EPSCoR program folders.

During the afternoon of the second day, the original members of each panel reconvened (with the exception of the EPSCoR panel which continued their deliberations) with the panel lead to merge and



finalize the findings from the first and second reads, and to prepare materials for the final report. The entire COV then met in executive session to discuss and reach consensus on the major findings and recommendations.

On the morning of the third day the COV Chair and panel leads finalized their findings and recommendations, then met and presented the major findings and recommendations to BES and MSE Division management, and subsequently to the MSE Division program managers.

The written reports from the panels (Appendix VI - Appendix IX) and the conclusions and recommendations drawn from the executive session provided the basis for this report.

## **5. Major Findings of the COV**

1. The Division attracts and manages a world class portfolio of research with skill and foresight.
2. The leadership teams are very dedicated and highly engaged with the community – researchers, professional venues, and government agencies. The COV commends the program managers in particular for their efforts to interact with individual PI's.
3. It is clear that the program managers actively manage their portfolios and their evolution. This is important given the wealth of top-flight research from which the Division can choose. The COV is also pleased to see that community input – from individual interactions to BESAC studies – is used as an integral component in this evolution.
4. PAMS is proving a real benefit. The COV is glad to see that the Division is committed to PAMS and anticipates future benefits from it.
5. The Division continues to support an exceptional core research program even as its scope expands – e.g., EFRCs, Hubs, Early Career Awards. However, effective management across this spectrum demands a healthy level of interaction with PI's and the community. The severe cuts in BES program manager travel budgets (50% over the past 5-8 years) are having a significant and detrimental effect on program management.
6. The white paper development process provides useful feedback to PI's and increases the efficiency of the process, the ultimate quality, and the alignment of funded proposals to the DOE mission. The diligence we witnessed in the program managers' guidance to PI's is profound, delivering a valuable service to the community and particularly early career scientists.
7. The program managers are effective in recruiting talented reviewers and gaining quality proposal reviews.

## **6. Major Recommendations of the COV**

1. BESAC will soon release its update to the 2007 Grand Challenges report, which will include several transformative opportunities critical to both fundamental and use-inspired science. The COV believes that increased funding would be highly appropriate to address these, and that the core programs reviewed here can play a critical role in executing these opportunities.
2. The COV's highest and most urgent priority is a substantial increase in travel funding for BES program managers, not only because of the precipitous drop in recent years, but because of the need to support the markedly broader scope of DMSE programs and missions – including EFRCs, Hubs, and Early Career awardees. For only a small fraction of the research budgets, increased travel funds for program managers ensure the success of awards and workforce development in the scientific community.
3. We encourage continued use of the white paper process in the core programs. Every effort should be made to preserve the timely, informal, frank, detailed nature of guidance the program managers

provide to PI's before and just after the white paper submissions. The evolving PAMS platform should not interrupt the interactive, individualized nature of feedback process now in place.

4. The assembled research highlights – both ppt and web format – provide a valuable synopsis of the research portfolio and communicate its value to a broader audience across science and society. Describing and disseminating research advances as highlights should continue to be a high priority for both the PI's and the program managers. Support should be provided for the special skills mix required for BES to facilitate the development of effective research highlight writeups.
5. The biennial meetings for PIs and program managers are very beneficial and should be continued.
6. While growing and receding research emphases are shared with the community in several ways, the COV recommends systematizing this process. The website and individual FOAs are quite different but important venues, both appropriate to share areas of new emphasis and de-emphasis of topics within the context of a much broader portfolio.
7. It is important to maintain a balance between the three EPSCoR funding modes: implementation grants, lab partnership grants, and early career awards. A strong portfolio has been built up in recent years for the implementation grants and Early Career awards. It is important now to reinvigorate the lab partnership part of the portfolio to take advantage of excellent capabilities and senior staff mentoring at the national laboratories to support development of early career scientists into future leading senior investigators.

# Appendix I: Charge from the Chair of BESAC, Prof. John Hemminger to the Chair of the COV, Prof. Gary Rubloff.

UNIVERSITY OF CALIFORNIA, IRVINE

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



SANTA BARBARA • SANTA CRUZ

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September 23, 2014

Professor Gary Rubloff  
Minta Martin Professor of Engineering and  
Director, Maryland NanoCenter  
Institute for Systems Research  
2145 A.V. Williams Building  
University of Maryland  
College Park, MD 20742-3285

Dear Professor Rubloff:

The Basic Energy Sciences Advisory Committee (BESAC) has been charged by the Department of Energy Office of Science to assemble a Committee of Visitors (COV) to review the management processes for the Materials Sciences and Engineering Division of the Basic Energy Sciences (BES) program. Thank you for agreeing to chair this BESAC COV panel. Under your leadership, the panel should provide an assessment of the processes used to solicit, review, recommend, and document proposal actions and monitor active projects and programs.

The panel should assess the operations of the Division's programs during the fiscal years 2012, 2013, and 2014. The panel may examine any files from this period for both DOE laboratory projects and university projects. The components of the Division that you are being asked to review are:

- (1) Materials Discovery, Design and Synthesis
- (2) Condensed Matter and Materials Physics
- (3) Scattering and Instrumentation Sciences
- (4) Experimental Program to Stimulate Competitive Research

You will be provided with background material on these program elements prior to the meeting.

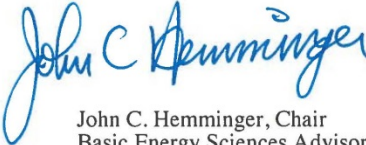
The COV is scheduled to take place during March 10 – 12, 2015 at the BES/DOE Germantown location at 19901 Germantown Road, Germantown, Maryland 20874-1290. A presentation to BESAC is requested at its July 2015 meeting (exact dates tbd). Following acceptance of the report by the full BESAC committee, the COV report with findings and recommendations will be presented to the Director of the Office of Science.

I would like the panel to consider and provide evaluation of the following four major elements:

1. For both the DOE laboratory projects and the university projects, assess the efficacy and quality of the processes used to:
  - (a) solicit, review, recommend, and document proposal actions and
  - (b) monitor active projects and programs.
2. Within the boundaries defined by DOE missions and available funding, comment on how the award process has affected:
  - (a) the breadth and depth of portfolio elements, and
  - (b) the national and international standing of the portfolio elements.

If you have any questions regarding BESAC or its legalities, please contact Katie Perine, Office of Basic Energy Sciences at 301-903-6529 or by e-mail at [katie.perine@science.doe.gov](mailto:katie.perine@science.doe.gov). Teresa Crockett, the Program Analyst for the Materials Sciences and Engineering Division, will provide logistical support for the COV meeting. She may be contacted by phone at 301-903-5804 or by e-mail at [teresa.crockett@science.doe.gov](mailto:teresa.crockett@science.doe.gov). For questions related to the Materials Sciences and Engineering Division, please contact Linda Horton, 301-903-7506, or by e-mail at [linda.horton@science.doe.gov](mailto:linda.horton@science.doe.gov). Also, if I can be of any help with the process, please feel free to contact me, 949-824-6020 or by email at [jchemmin@uci.edu](mailto:jchemmin@uci.edu).

Sincerely,



John C. Hemminger, Chair  
Basic Energy Sciences Advisory Committee

cc: T. Crockett  
L. Horton  
H. Kung  
K. Perine

## Appendix II: COV Members and Contact Information

Last Name	First Name	Affiliation	Email
Bobev	Svilen	University of Delaware	<a href="mailto:BOBEV@UDEL.EDU">BOBEV@UDEL.EDU</a>
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**Thiel	Pat	Ames Laboratory/Iowa State	<a href="mailto:thiel@ameslab.gov">thiel@ameslab.gov</a>
Wilson	Bill	University of Illinois	<a href="mailto:wwilson@illinois.edu">wwilson@illinois.edu</a>

\* COV Chair

\*\*Panel Leads

\*\*\*BESAC Chair

## Appendix III: COV Panel Assignments

<b>Panel 1</b>	<b>Scattering and Instrumentation Sciences</b> Electron and Scanning Probe Microscopies, Neutron Scattering, X-Ray Scattering			
<b>Chair: Eric Stach</b>	<b>Panel Members</b>			
	Tom Devereaux	Ernie Hall	Janna Maranas	
<b>Panel 2</b>	<b>Materials Discovery, Design and Synthesis</b> Biomolecular Materials, Materials Chemistry, Synthesis and Processing			
<b>Chair: Pat Thiel</b>	<b>Panel Members</b>			
	Svilen Bobev	Tom Picraux	Amy Prieto	Bill Wilson
<b>Panel 3</b>	<b>Condensed Matter and Materials Physics</b> Experimental Condensed Matter Physics, Mechanical Behavior and Radiation Effects, Physical Behavior, Theory Condensed Matter Physics			
<b>Chair: Giulia Galli</b>	<b>Panel Members</b>			
	Clyde Briant	Louis Brus	Len Feldman	Irena Knezevic
	Warren Pickett			

<b>Panel 1A</b>	<b>Scattering and Instrumentation Sciences</b> Electron and Scanning Probe Microscopies, Neutron Scattering, X-Ray Scattering		
<b>Chair: Eric Stach</b>	<b>Panel Members</b>		
	Len Feldman	Irena Knezevic	
<b>Panel 2A</b>	<b>Materials Discovery, Design and Synthesis</b> Biomolecular Materials, Materials Chemistry, Synthesis and Processing		
<b>Chair: Pat Thiel</b>	<b>Panel Members</b>		
	Louis Brus	Janna Maranas	Warren Pickett
<b>Panel 3A</b>	<b>Condensed Matter and Materials Physics</b> Experimental Condensed Matter Physics, Mechanical Behavior and Radiation Effects, Physical Behavior, Theory Condensed Matter Physics		
<b>Chair: Giulia Galli</b>	<b>Panel Members</b>		
	Tom Devereaux	Ernie Hall	Amy Prieto
	Bill Wilson		

<b>EPSCoR Panel 4</b>
<b>Chair: Tom Picraux</b>
Clyde Briant
Svilen Bobev

# Appendix IV: COV Agenda

## Committee of Visitors Review of the Materials Sciences and Engineering Division March 10 - 12, 2015, DOE Germantown Complex

Tuesday, March 10, 2015

Time	Activity	Participants/Lead	Location
7:50am	Pick-up via hotel shuttle	COV Members/Helen Kerch & Arvind Kini	Front of Hotel
8:00am - 8:30am	Check-in Germantown Facility	COV Members/BES Staff	North Lobby
8:30am - 8:40am	Introductions	COV Members/BES Staff	A-410
8:40am - 8:50am	Welcome and Charge to the Committee	John Hemminger, BESAC Chair	A-410
8:50am - 9:05am	Welcome and SC-BES Overview	Harriet Kung, BES Associate Director	A-410
9:05am - 10:15am	MSE Overview, Statistics & Electronic File Demo	Linda Horton, MSE Division Director	A-410
10:15am - 10:45am	Instructions, procedures, and schedule	Gary Rubloff, COV Chair	A-410
10:45am - 11:00am	Move to Panel Rooms Refreshment Break in each panel room		
11:00am - 12:30pm	<b>Team Overviews:</b> • PM presentations (10 mins each plus discussions) • Q&A with MSE Rep • Preliminary Review of Folders		
Panel Breakouts	Panel 1 – Scattering & Instrumentation Sciences Team	Panel 1 - Eric Stach, Lead MSE Rep: Helen Kerch MSE Staff: P. Thyagarajan, Lane Wilson, Jane Zhu Admin Support: Cheryl Howard	E-301
	Panel 2 – Materials Discovery, Design, and Synthesis Team	Panel 2 – Pat Thiel, Lead MSE Rep: Arvind Kini MSE Staff: Bonnie Gersten, Craig Henderson, Michael Markowitz, Michael Sennett Admin Support: MaryBeth Luther	E-401
	Panel 3 – Condensed Matter & Materials Physics Team	Panel 3 - Giulia Galli, Lead MSE Rep: Jim Horwitz MSE Staff: Jim Davenport, Matthias Graf, Refik Kortan, Mick Pechan, John Veltrano Admin Support: Marsophia Agnant	A-410
12:30pm - 4:30pm	Same Breakout Panels and Meeting Locations as Listed Above  First Read: Review Folders and Formulate Panel Comments  ***Lunch - COV members will go to the DOE Cafeteria*** ***Afternoon refreshments will be available in Panel Rooms***		
4:30pm - 4:45pm	Panel Members Check-out Germantown Facility / Return to Hotel	COV members/BES Staff	Germantown Front Entrance
4:30pm - 5:00pm	COV Executive Session	COV Panel Leads and Chair	G-426
5:00pm - 5:30pm	COV and BES General Discussion	COV Panel Leads & Chair and BES Management	G-426
5:30pm - 5:45pm	COV Chairs / Team Lead Check-out Germantown Facility	COV members/Teresa Crockett	North Lobby
6:00pm - 7:30pm	Dinner	MSE/COV members	Holiday Inn

**Committee of Visitors Review of the Materials Sciences and Engineering Division  
March 10 - 12, 2015, DOE Germantown Complex**

**Wednesday, March 11, 2015**

Time	Activity	Participants/Lead	Location
7:50am	Pick-up via hotel shuttle	COV Members/Helen Kerch & Arvind Kini	Front of Hotel
8:00am - 8:30am	Check-in Germantown Facility	COV Members/BES Staff	North Lobby
8:30am - 11:30am	<b>Panel 1A</b> – Scattering & Instrumentation Sciences Team Includes brief Overview from Team Lead	<b>Panel 1A</b> - Eric Stach, Lead MSE Rep: Helen Kerch MSE Staff: P. Thyagarajan, Lane Wilson, Janie Zhu Admin Support: Cheryl Howard	E-301
	<b>Panel 2A</b> – Materials Discovery, Design, and Synthesis Team Includes brief Overview from Team Lead	<b>Panel 2A</b> – Pat Thiel, Lead MSE Rep: Arvind Kini MSE Staff: Bonnie Gersten, Craig Henderson, Michael Markowitz, Michael Sennett Admin Support: MaryBeth Luther	E-401
	<b>Panel 3A</b> – Condensed Matter & Materials Physics Team Includes brief Overview from Team Lead	<b>Panel 3A</b> - Giulia Galli, Lead MSE Rep: Jim Horwitz MSE Staff: Jim Davenport, Matthias Graf, Refik Kortan, Mick Pechan, John Vetrano Admin Support: Marsophia Agnant	A-410
	<b>Panel 4</b> – EPSCoR Brief Overview of EPSCoR	<b>Panel 4</b> - Tom Picraux, Lead MSE Rep: Helen Kerch / Linda Horton MSE Staff: Tim Fitzsimmons Admin Support: Cheryl Howard	F-441
	<b>Second Read: •Review of Folders •Formulate Panel Comments •Review 1st Read Comments</b>		
***Refreshments will be available in Panel Rooms***			
11:30am - 1:00pm	COV Members will have lunch in the DOE Cafeteria		
12:30pm - 1:30pm	COV Executive Session Preliminary Panel Findings	COV Panel Leads and Chair	G-426
1:30pm - 4:50pm	<b>Report Preparation and Panel Breakouts</b>	Panel 1 - Eric Stach (First day reviewers)	E-301
		Panel 2 - Pat Thiel, Lead (First day reviewers)	E-401
		Panel 3 - Giulia Galli, Lead (First day reviewers)	A-410
		Panel 4 - Tom Picraux, Lead	F-441
	<b>Report Preparation:</b>	• Merge 1st and 2nd Read Comments • Outline Summary for Briefing	• Formulate Panel Final Comments • Prepare Draft Panel Report
4:50pm - 5:00pm	Check-out Germantown Facility	COV members/Teresa Crockett, Admin Staff	North Lobby
5:00pm - 5:30pm	COV Executive Session Preliminary Panel Findings	COV Panel Leads and Chair	G-426
5:30pm	Return to Hotel	COV Members/BES Staff	Germantown Front Entrance
6:00pm - 7:30pm	Dinner		On your own

**Thursday, March 12, 2015**

Time	Activity	Participants/Lead	Location
7:50am	Pick-up by hotel shuttle or Team Leads or rental cars	COV Chair & Panel Leads/Team Leads	Front of Hotel
8:00am - 8:30am	Check-in Germantown Facility	COV Chair & Panel Leads/BES Staff	North Lobby
8:30am - 9:15am	Breakout Panels - Final Wrap-Up	COV Chair & Panel Leads	A-410
9:15am - 10:00am	COV Executive Session	COV Chair & Panel Leads / BES Management	A-410
10:00am - 11:00am	Closeout Session	COV Chair & Panel Leads / BES Staff	A-410
11:00am	Adjourn - Thank You!		



# Appendix V: First Read/Second Read COV Report Input Template and Progress Towards the Long-term Goals of the Office of BES

## XXX Report

### BES COMMITTEE OF VISITORS (COV) Reviewing the Materials Sciences and Engineering Division Fiscal Years 2012, 2013, and 2014

#### **Charge to the COV:**

1. For both the DOE laboratory projects and the university projects, assess the efficacy and quality of the processes used to:

- (a) solicit, review, recommend, and document proposal actions and
- (b) monitor active projects and program.

2. Within the boundaries defined by DOE missions and available funding, comment on how the award process has affected:

- (a) the breadth and depth of portfolio elements, and
- (b) the national and international standing of the portfolio elements.

## I. EFFICACY AND QUALITY OF THE PROGRAM'S PROCESSES

Based on the COV's study of proposal actions completed within the past three fiscal years, please provide brief findings, recommendations, and comments on the following aspects of the programs's processes and management used to:

### **(a) Solicit, review, recommend, and document proposal actions**

Consider, for example:

- consistency with priorities and criteria stated in the program's solicitations, announcements, and guidelines
- adequate number of reviewers for balanced review; use of reviewers having appropriate expertise/qualifications; use of a sufficiently broad pool of reviewers; avoidance of conflicts of interest
- efficiency/time to decision
- completeness of documentation making recommendations

Findings: Comments: Recommendations:

### **(b) Monitor active project and programs**

Consider, for example

- written progress reports
- principal investigators' meetings
- site visits
- interactions at topical, national and other meetings;

Findings:

Comments: Recommendations:

## II. EFFECT OF THE AWARD PROCESS ON PORTFOLIOS

Taking into account the DOE, BES, and Division missions, the available funding, and information presented about the portfolio of funded science, comment on how the award process has affected:

### ***(a) the breadth and depth of portfolio elements***

Consider, for example:

- *the overall quality of the science*
- *the balance of projects with respect to innovation, risk, and interdisciplinary research*
- *the evolution of the portfolio with respect to new investigators and new science thrusts*
- *the relationship of the portfolio to other parts of the Division*
- *the appropriateness of award scope, size, and duration*

Findings:

Comments:

Recommendations:

### ***(b) the national and international standing of the portfolio elements***

Consider, for example:

- *the uniqueness, significance, and scientific impact of the portfolio*
- *the stature of the portfolio principal investigators in their fields*
- *the leadership position of the portfolio in the nation and the world*

Findings:

Comments:

Recommendations:

# Appendix VI: Summary Reports from Panel 1 (SIS)

## Scattering and Instrumentation Sciences Report

### BES COMMITTEE OF VISITORS (COV) Reviewing the Materials Sciences and Engineering Division Fiscal Years 2012, 2013, and 2014

#### **Charge to the COV:**

1. For both the DOE laboratory projects and the university projects, assess the efficacy and quality of the processes used to:

(a) solicit, review, recommend, and document proposal actions and

(b) monitor active projects and program.

2. Within the boundaries defined by DOE missions and available funding, comment on how the award process has affected:

(a) the breadth and depth of portfolio elements, and

(b) the national and international standing of the portfolio elements.

#### **I. EFFICACY AND QUALITY OF THE PROGRAM'S PROCESSES**

Based on the COV's study of proposal actions completed within the past three fiscal years, please provide brief findings, recommendations, and comments on the following aspects of the programs's processes and management used to:

##### **(a) Solicit, review, recommend, and document proposal actions**

Consider, for example:

- consistency with priorities and criteria stated in the program's solicitations, announcements, and guidelines
- adequate number of reviewers for balanced review; use of reviewers having appropriate expertise/qualifications; use of a sufficiently broad pool of reviewers; avoidance of conflicts of interest
- efficiency/time to decision
- completeness of documentation making recommendations

##### **Findings:**

- The Scattering and Instrumentation Science (SIS) program within the Division of Materials Sciences and Engineering is effectively soliciting, evaluating and awarding a portfolio of world-class research. The committee was impressed with both the number and the superb quality of the independent reviews, from world-leading scientists. This was true for both new and renewing proposals, and for those coming from both the laboratories and from the academic community. These reviews accurately evaluate the proposals, and provide insight into the high-risk, high-reward nature of the research.
- The program managers have a clear vision of their research programs, and were effective at both identifying emerging research areas and re-balancing their programs to align with evolving needs. It was also clear that difficult decisions are being made regarding funding renewal, both in response to lower levels of overall funding, as well as to refresh the portfolio.
- The program is driven by science, and not technique, and makes strong efforts to integrate synthesis

and theory as needed to advance the science case. The COV finds this approach impactful and appropriate.

- The committee was impressed with the systematic internal documentation and oversight of the decision making process, through all levels of management.
- The panel noted that for the ESPM and XS portfolios, there were a number of strong proposals that were not supported due to lack of funding. This is despite the explosion of new capabilities at the DOE-supported facilities and in the wider community.
- From the random sample of proposals that were included in the COV, the average time to decision was about 5 months, indicating that the program managers are being attentive to this metric. This is despite the substantial uncertainties in the budget process during this time period.
- The panel found that there is excellent communication between PIs / proposers and the program managers at all stages of the process, from White Paper to the eventual award / decline notification. This interactivity is commendable, and clearly leads to both improved proposals, and activities that are better aligned with the DOE mission. As an example, we found that for the new initiative in ultrafast, the proposals selected were consistent with the solicitation, and were at the forefront of the field.
- The COV found that the rebuttal process is being used as an effective component of the decision making process, especially in case of proposals where the decision is at the fund / not fund border.
- PAMS has made remarkable progress since the last COV. Further implementation will streamline the process and aid in documenting the process more completely.

#### **Comments:**

- Regarding the COV process, it was difficult to understand how the declination process is communicated to the PI. It is not clear how the PI learns if the declination is due to solely poor reviews, or due to lack of programmatic alignment. Direct discussion with program managers clarified this aspect, for each program. We expect this to be clearer during the next COV, with the further implementation of PAMS.

#### **Recommendations:**

- Continue the progress in documenting correspondence within PAMS.
- Program managers should continue to communicate the areas of emphasis to PIs via the solicitation, without being overly explicit, and thus too strongly limiting lines of inquiry.
- The pre-proposal process could be made clearer to potential investigators, specifically the mechanisms and advantages of personal communication with program managers, and the role and effectiveness of white papers.
- The panel recommends that all solicitations have language that indicates areas of increasing program emphasis and de-emphasis.

#### ***(b) Monitor active project and programs***

*Consider, for example*

- *written progress reports*
- *principal investigators' meetings*
- *site visits*

- *interactions at topical, national and other meetings;*

### **Findings:**

- The program managers employ multiple effective mechanisms for monitoring projects and programs. These include annual progress reports, PI meetings, periodic visits by laboratory coordinators, visits / lab reviews when appropriate, workshops and conferences. The PI meetings can also be useful for fostering new collaborations between different PIs and are an excellent mechanism for the program managers to review the whole portfolio in expedient manner.
- The use of well-chosen, broadly accessible highlights is extremely important for communicating the value and excitement of DOE research to the broader community.

### **Comments:**

### **Recommendations:**

- Despite the robust monitoring systems in place, the lack of travel funds for the program managers inhibits their ability to execute portions of this work efficaciously, as it impedes site visits to the laboratories, as well as to key university programs.

## **II. EFFECT OF THE AWARD PROCESS ON PORTFOLIOS**

Taking into account the DOE, BES, and Division missions, the available funding, and information presented about the portfolio of funded science, comment on how the award process has affected:

### ***(a) the breadth and depth of portfolio elements***

*Consider, for example:*

- *the overall quality of the science*
- *the balance of projects with respect to innovation, risk, and interdisciplinary research*
- *the evolution of the portfolio with respect to new investigators and new science thrusts*
- *the relationship of the portfolio to other parts of the Division*
- *the appropriateness of award scope, size, and duration*

### **Findings:**

- We are extremely impressed with the breadth and depth of the research being supported. A large proportion of the leaders in their respective fields see support from these programs: this includes well-established PIs, successful mid-career scientists and up and coming early career researchers. This was true across all portfolios.
  - Neutron Scattering: A focus on hard materials, soft materials and instrumentation. The soft matter has less representation, but this is being addressed systematically. The development of instrumentation is important and being considered in the process. The panel felt that it was impressive that approximately 45% of the user research at SNS and HFIR is supported by this BES core program.
  - Electron and Scanning Probe Microscopies: a wide range of leading research was observed across the scope of electron microscopy, electron scattering and scanned probes. Research areas spanned many innovative areas, across nearly all active fields of materials research.
  - X-ray Scattering: wide range of leading research across core activity in spectroscopy and instrumentation, and new emerging areas in ultrafast science.

- The panel felt that support of directed educational activities centered on fundamentals of scattering and facility utilization are effective and should be supported.
- The tight integration of scattering research and leading synthesis and theoretical efforts was found to be critical to program success. This level of integration is commendable and should continue to see emphasis.
- There was evidence of thoughtful decisions to terminate some programs, allowing funding of new investigators. This allowed the portfolio to evolve in terms of both subject matter and PIs. This was accomplished despite the difficult funding environment associated with forward funding and general budgetary uncertainty. We felt the level of turnover in the program to be about right, and that the portfolios contained a good balance of long term support and integration of new and vibrant research efforts.

**Comments:**

**Recommendations:**

- It is important to continue to define strategic directions that reflect the input of the community. This allows the program managers to appropriately delineate areas of emphasis / de-emphasis.
- The funding for new scattering research needs to grow to match the substantial investments in new scientific capabilities and facilities. Research in this program has led to significant methods to exploit these facilities and dramatically enhances the value of the facility investments.
- With the dramatic increase in instrument data rates enabled by brighter sources and faster detectors, there is an increasing need for integration between data analysis / mining and scattering science. We recommend that ideas at the interface between forefront Data Sciences and scattering sciences be considered as part of the portfolio.

***(b) the national and international standing of the portfolio elements***

Consider, for example:

- *the uniqueness, significance, and scientific impact of the portfolio*
- *the stature of the portfolio principal investigators in their fields*
- *the leadership position of the portfolio in the nation and the world*

**Findings:**

- There is no question that the research being supported in this portfolio is comprised of world-leaders in their respective fields. This is evidenced in the demonstrable impact of the publication record, their international reputation, and their ability to drive their respective fields in innovative new directions.
- While DOE continues to invest heavily in leading x-ray and neutron capabilities at the National Laboratories, it is not clear that the electron microscopy capabilities at the national labs are seeing the sustained attention necessary to maintain their position as world-leading programs. The effectiveness of the core-program will soon be negatively affected if these capabilities lag.
- Perhaps nowhere is the dire funding situation for travel more apparent. There are substantial strengths in neutron and x-ray scattering and electron microscopy abroad. It is imperative for program managers to be aware of these developments in order to accurately assess their respective fields, to be informed of exciting new developments and to benchmark U.S. efforts versus the best in the world. While some of this can be accomplished remotely, visits to leading world facilities are

essential. It is also clear that the program managers in this team have broad and complex science responsibilities (for example, they need expertise in the cutting-edge research in both their instrumentation area and in materials science) and need to attend more than one technical meeting a year to learn, grow, and network.

**Comments:**

**Recommendations:**

- Investment in world-leading electron microscopy capabilities at the National Laboratories facilities is essential for the U.S. to remain competitive at the international level. This has a direct impact on the Electron and Scanning Probe Microscopies portfolio.
- Increased travel funding for SIS program managers is essential for their success in continuing a world-class research portfolio.

## Appendix VII: Summary Reports from Panel 2 (MDDS)

### Materials Discovery, Design, and Synthesis Report

#### BES COMMITTEE OF VISITORS (COV) Reviewing the Materials Sciences and Engineering Division Fiscal Years 2012, 2013, and 2014

##### **Charge to the COV:**

1. For both the DOE laboratory projects and the university projects, assess the efficacy and quality of the processes used to:

- (a) solicit, review, recommend, and document proposal actions and
- (b) monitor active projects and program.

2. Within the boundaries defined by DOE missions and available funding, comment on how the award process has affected:

- (a) the breadth and depth of portfolio elements, and
- (b) the national and international standing of the portfolio elements.

#### **I. EFFICACY AND QUALITY OF THE PROGRAM'S PROCESSES**

Based on the COV's study of proposal actions completed within the past three fiscal years, please provide brief findings, recommendations, and comments on the following aspects of the programs's processes and management used to:

##### **(a) Solicit, review, recommend, and document proposal actions**

Consider, for example:

- consistency with priorities and criteria stated in the program's solicitations, announcements, and guidelines
- adequate number of reviewers for balanced review; use of reviewers having appropriate expertise/qualifications; use of a sufficiently broad pool of reviewers; avoidance of conflicts of interest
- efficiency/time to decision
- completeness of documentation making recommendations

##### **Findings:**

- We were extremely impressed with the quality and magnitude of the effort expended by MDDS program managers in providing guidance to proposals in the initial stages, especially before and immediately after white paper submission. The emails that the MDDS staff sent to scientists in the guidance stage were often remarkably detailed, lengthy, frank, and well-written. Responses were also very fast; for instance, we found one inquiry from a prospective grantee that was answered three hours later—in the evening—by the program manager. This kind of guidance is extremely valuable to the scientific community. MDDS is to be applauded and thanked for providing this. It is likely that the quality of proposals is enhanced by this process.
- We were also impressed with the decision documents generated by MDDS. Again, the quality of the writing by BES program officers was exceptional. Every document we examined was thorough and compelling. In the case of difficult decisions, the pros and cons were clearly defined. The program officer did not simply parrot the referee reports, but added contextual information and their own



judgments. The reason behind the decision was always clear.

- We found that proposals were evaluated fairly and thoroughly, whether from universities or from national laboratories.

**Comments:**

**Recommendations:**

- The option and advantages of submitting a white paper for a university proposal should be communicated to the university research community widely and aggressively.

**(b) Monitor active project and programs**

Consider, for example

- *written progress reports*
- *principal investigators' meetings*
- *site visits*
- *interactions at topical, national and other meetings;*

**Findings:**

- Current limitations on program manager travel funds severely hinder BES' ability to administer taxpayer funds responsibly. We consider that BES is analogous to a company managing an investment portfolio. It would be irresponsible for the managing party to invest such large sums without the ability to monitor the investment in real time.
- Furthermore, it is nearly impossible for a program officer to stay up-to-date on latest developments in the field, and its major practitioners, without attending conferences. The breadth of the portfolios is such that several conferences per year are necessary to span the entire portfolio. And finally, the personal, face-to-face dynamic available through travel is essential to cultivate the reviewer community, deliver information about the grant process, and dispel myths about the agency. One of the strengths of this team is its focus on real-time interactions with the scientific community, and travel is an indispensable tool for this purpose.
- It appears that the program officers have found ways to compensate for the severe shortage of travel freedom in the past two years. However, adverse effects are cumulative, and will be increasingly difficult to mitigate as portfolios evolve, particularly considering that many of the most exciting new developments are cross-cutting.

**Comments:**

**Recommendations:**

**II. EFFECT OF THE AWARD PROCESS ON PORTFOLIOS**

*Taking into account the DOE, BES, and Division missions, the available funding, and information presented about the portfolio of funded science, comment on how the award process has affected:*

**(a) the breadth and depth of portfolio elements**

Consider, for example:

- *the overall quality of the science*
- *the balance of projects with respect to innovation, risk, and interdisciplinary research*

- *the evolution of the portfolio with respect to new investigators and new science thrusts*
- *the relationship of the portfolio to other parts of the Division*
- *the appropriateness of award scope, size, and duration*

**Findings:**

- The MDDS programs have an excellent balance of breadth and diversity. For example, in biomaterials there is a nice mix from growth and synthesis of structures, to directed self-assembly, to strategies to control self-assembly. The resulting DOE programs are comprehensive and well-balanced.

**Comments:**

- In general, it is not clear what information the BES program managers are using to balance their portfolios, and to make decisions about which areas to emphasize and which to de-emphasize in the ongoing process of evolution. Even though this process is not quite clear, in the MDDS program these functions are being executed extremely well. As such, MDDS might be considered a model that could be applied more broadly in BES.

**Recommendations:**

***(b) the national and international standing of the portfolio elements***

*Consider, for example:*

- *the uniqueness, significance, and scientific impact of the portfolio*
- *the stature of the portfolio principal investigators in their fields*
- *the leadership position of the portfolio in the nation and the world*

**Findings:**

- The international standing is quite high on the whole. Materials chemistry has an extremely good balance, spanning molecular systems through polymers and nanostructured materials, to extended solids. Synthesis and processing science has an exciting portfolio and is doing an excellent job of supporting fundamental science in an area where applications will naturally develop from such investments. An intriguing example is the growth of metallic nanorods, where initial theoretical modeling has led to new technology that may extend the lifetime of photovoltaics. The biomaterials portfolio is notably strong, in its mix of fundamental programs and programs that have substantial risk, e.g. self-healing polymers and biomolecular generation of semiconductors.

**Comments:**

**Recommendations:**

# Appendix VIII: Summary Reports from Panel 3 (CMMP)

## Condensed Matter and Materials Physics Report

### BES COMMITTEE OF VISITORS (COV) Reviewing the Materials Sciences and Engineering Division Fiscal Years 2012, 2013, and 2014

#### **Charge to the COV:**

1. For both the DOE laboratory projects and the university projects, assess the efficacy and quality of the processes used to:

- (a) solicit, review, recommend, and document proposal actions and
- (b) monitor active projects and program.

2. Within the boundaries defined by DOE missions and available funding, comment on how the award process has affected:

- (a) the breadth and depth of portfolio elements, and
- (b) the national and international standing of the portfolio elements.

#### **I. EFFICACY AND QUALITY OF THE PROGRAM'S PROCESSES**

Based on the COV's study of proposal actions completed within the past three fiscal years, please provide brief findings, recommendations, and comments on the following aspects of the programs's processes and management used to:

##### **(a) Solicit, review, recommend, and document proposal actions**

Consider, for example:

- consistency with priorities and criteria stated in the program's solicitations, announcements, and guidelines
- adequate number of reviewers for balanced review; use of reviewers having appropriate expertise/qualifications; use of a sufficiently broad pool of reviewers; avoidance of conflicts of interest
- efficiency/time to decision
- completeness of documentation making recommendations

##### **Findings:**

- The program managers at CMMP handle a large number of applications over a broad spectrum of research in condensed matter and materials physics with expertise and efficiency. Decisions are generally well supported by the reviews. An exception to this is applications that are denied for the sole reason of lack of funds, or for the reason that the program manager believes he/she already has a strong effort in this specific area. The idea of asking the PI for a rebuttal if reviews are mixed was found helpful to clarify issues.
- The panel found that the peer review system was put to work effectively: most reviewers made a serious attempt to point out flaws and strengths of the proposal; only a few reviews were too brief. No special special deference was given to senior or famous academics in the reviews.
- The panel also found that at National Laboratories the FWP process is very well thought out and clearly implemented.

- Connection of the program to the BESAC reports was not overtly recognized in the presentations we saw from the program managers.

### Comments:

- The analysis section of the DOE declination letter did not always describe the various competing factors going into the decision. This makes it hard for COV members, reading these internal documents, to understand the decision process.

### Recommendations:

- The panel recommends that program managers encourage extensive use of white papers for submission of new proposals, along with tracking the number of white paper submissions as a measure of interest and workload for the CMMP program. The panel also recommends more extensive communications of the program goals and focus areas to the community, and more travel flexibility for the program managers so as to strengthen their communication and connections to the PIs.
- We found that proposals that received good but not great reviews are funded if they are in areas of high future relevance, and that a strongly reviewed proposal can be declined if it is in an area of low relevance to the future portfolio. It is very important that potential PIs, especially beginning academics, understand this aspect of DOE BES operation. It is also important that the community understand which themes in various portfolios are found relevant versus ones which are being de-emphasized. While this information is on the website, it is not readily accessible or strongly underscored there, though it is discussed when a potential PI calls the program managers. We encourage better communication to the community of DOE/BES policies and expectations, including expectations on number and quality of papers.

### **(b) Monitor active project and programs**

*Consider, for example*

- *written progress reports*
- *principal investigators' meetings*
- *site visits*
- *interactions at topical, national and other meetings;*

### Findings:

- We commend the following monitoring activities applied consistently across the various programs: reported publications, acknowledgements in papers, annual reports, scrutiny of current and pending lists and unexpended funds. We found great value in the PI bi-annual meetings to form cohesive communities of scientists in various topical areas.

### Comments:

- The lab review process is streamlined and well implemented. Some FWPs failed because the participant's time was too fragmented. FWPs could be more successful if researchers were more focused on a small number of projects.

### Recommendations:

- We recommend continuing the successful bi-annual PI meetings for all programs.
- We encourage and emphasize the use of white papers to pre-screen proposal ideas according to

their programmatic importance and anticipated quality. We encourage clear communication of expectations as to what constitutes adequate productivity, especially in terms of the number and quality of published papers versus grant duration and award size.

## II. EFFECT OF THE AWARD PROCESS ON PORTFOLIOS

*Taking into account the DOE, BES, and Division missions, the available funding, and information presented about the portfolio of funded science, comment on how the award process has affected:*

### ***(a) the breadth and depth of portfolio elements***

*Consider, for example:*

- the overall quality of the science*
- the balance of projects with respect to innovation, risk, and interdisciplinary research*
- the evolution of the portfolio with respect to new investigators and new science thrusts*
- the relationship of the portfolio to other parts of the Division*
- the appropriateness of award scope, size, and duration*

### **Findings:**

- We found that all programs are expertly and fairly run and show a healthy turnover of focus areas and individual grantees. The portfolio includes outstanding scientists, both junior and senior. Excellent integration of early career awardees with the core program is commendable.
- The portfolio also includes a wide range of modern focus areas with strong potential for new science. We found that interdisciplinary activities are encouraged when deemed necessary and a good balance is maintained between risk taking and investments in successful core activities.
- The program managers continuously adjust their portfolios, adding new areas of research emphasis, and dropping older or mature areas (sometimes transferring them to applied divisions), as they perceive new opportunities for materials research. This adjustment is based partially on their own judgment, and partially on input from the research community. In a situation of flat budgets, active management of this kind ensures efficiency and maximum benefit from the research investment.

### **Comments:**

- Funded activities appear to be driven solely by the quality of the work proposed, without bias of location (university name) or the PI's seniority or fame.
- The overall program may benefit from a better description of the delineation between the Experimental Condensed Matter Physics and the Physical Behavior of Materials portfolios and from articulating the research directions in Physical Behavior of Materials in terms of a smaller number of topically broad themes.
- Changes in portfolios should be publicized and made better known to the community.
- The Experimental Condensed Matter Physics and Materials Chemistry programs appear to be complementary and synergistic.
- We found that the current TCMP activities, strategic planning for the future and growing new directions form a particularly well formulated portfolio and they are well connected to experimental activities within the overall program and BES in general.
- The MBRE program appeared to be more strategically focused at national labs than at universities.

### **Recommendations:**

- The panel recommends that program managers continue funding cutting edge science both in universities and labs. It also recommends an increased focus on integration of computational activities (beyond traditional condensed matter physics) with experiments at DOE facilities, e.g. synchrotron and neutron facilities.
- We welcome the transition to PAMS and encourage its implementation and use also for collecting statistics on PIs and grants.

### ***(b) the national and international standing of the portfolio elements***

*Consider, for example:*

- *the uniqueness, significance, and scientific impact of the portfolio*
- *the stature of the portfolio principal investigators in their fields*
- *the leadership position of the portfolio in the nation and the world*

### **Findings:**

- The stature and leadership position of many of the senior PIs are excellent. Promising younger investigators are also funded. The leadership position of the portfolio in the nation and the world is outstanding.

### **Comments:**

- International referees should receive enough guidance as to what constitutes an appropriate review for DOE BES programs. Program managers should strive to secure a majority of domestic reviewers.

### **Recommendations:**

- The Division might consider recognizing international collaborators on grants and acknowledging their contributions.

# Appendix IX: Summary Reports from Panel 4 (EPSCoR)

## EPSCoR Report

### BES COMMITTEE OF VISITORS (COV) Reviewing the Materials Sciences and Engineering Division Fiscal Years 2012, 2013, and 2014

#### *Charge to the COV:*

1. For both the DOE laboratory projects and the university projects, assess the efficacy and quality of the processes used to:

- (a) solicit, review, recommend, and document proposal actions and
- (b) monitor active projects and program.

2. Within the boundaries defined by DOE missions and available funding, comment on how the award process has affected:

- (a) the breadth and depth of portfolio elements, and
- (b) the national and international standing of the portfolio elements.

#### **I. EFFICACY AND QUALITY OF THE PROGRAM'S PROCESSES**

Based on the COV's study of proposal actions completed within the past three fiscal years, please provide brief findings, recommendations, and comments on the following aspects of the programs's processes and management used to:

##### ***(a) Solicit, review, recommend, and document proposal actions***

Consider, for example:

- consistency with priorities and criteria stated in the program's solicitations, announcements, and guidelines
- adequate number of reviewers for balanced review; use of reviewers having appropriate expertise/qualifications; use of a sufficiently broad pool of reviewers; avoidance of conflicts of interest
- efficiency/time to decision
- completeness of documentation making recommendations

##### **Findings:**

- The overall quality of the management of the EPSCoR program in DOE is exceptional.
- Management of resources is very impressive, given the limited funds and wide range of areas to be covered.
- There is a very effective of integration of the EPSCoR project with energy programs.
- The program manager does an excellent job of pro-actively engaging the EPSCoR program proposers with the relevant DOE programs and the managers of these programs.
- The evaluation criteria clearly address the core of the EPSCoR mission of first scientific merit and second building state programs of scientific impact.
- Decision letter explanations were well thought out, reflecting a very good understanding of program constraints and opportunities to optimally use EPSCoR funds.

### Comments:

- The scoring system in combination with clear written evaluations of the reviews provide for good consistency with the priorities of the program solicitations, announcements, and guidelines. By not highlighting the numerical score in the FOA, it allows for flexibility in achieving a balanced review.
- The COV observes that there is an opportunity for reviewers to comment more on the likelihood of success of implementation awards in their proposal evaluations.

### Recommendations:

- The COV encourages continued efforts to find effective means of communicating to reviewers the importance of the 'likelihood of success' criteria in the evaluation process.

#### **(b) Monitor active project and programs**

Consider, for example

- *written progress reports*
- *principal investigators' meetings*
- *site visits*
- *interactions at topical, national and other meetings;*

### Findings:

- Management adds value by pro-actively engaging the investigators of implementation grants for optimized cooperation, interaction, and response to reviewer suggestions early in the award period.
- Emphasis is given to site and reverse site visits to enhance synergy between investigators of the implementation grants. These visits, along with the tele-conference calls are critical to the success of project monitoring.
- By bringing the PIs of these EPSCoR grants to the appropriate PI meetings under their DOE sponsoring program, the possible long term sustainability of each program is enhanced.

### Comments:

### Recommendations:

- Pro-active team development within EPSCoR projects is important and is greatly enhanced by program manager travel to conduct on-site visits and reviews. This EPSCoR program effort, along with the other BES program travel activities, is of significant benefit and should be increased to the extent possible.

## **II. EFFECT OF THE AWARD PROCESS ON PORTFOLIOS**

*Taking into account the DOE, BES, and Division missions, the available funding, and information presented about the portfolio of funded science, comment on how the award process has affected:*

#### **(a) How the award process has addressed the EPSCoR program goals**

Consider, for example:

- *the overall quality of the science*
- *the balance of projects with respect to innovation, risk, and interdisciplinary research*
- *the contributions of the program in advancing the DOE energy mission goals*



### Findings:

- The portfolio of EPSCoR projects provides very good breadth across DOE science and programmatic areas.
- The use of funds for early career awards provides a vital component to building long term research capacity in EPSCoR states and is encouraged.

### Comments:

#### Recommendations:

- It is important to maintain a balance between the three EPSCoR funding modes: implementation grants, lab partnership grants, and early career awards. A strong portfolio has been built up in recent years for the implementation grants and Early Career awards. It is important now to reinvigorate the lab partnership part of the portfolio to take advantage of excellent capabilities and senior staff mentoring at the national laboratories to support development of early career scientists into future leading senior investigators.

#### ***(b) the national and international standing of the portfolio elements***

Consider, for example:

- *the uniqueness, significance, and scientific impact of the portfolio*
- *the stature of the portfolio principal investigators in their fields*
- *the leadership position of the portfolio in the nation and the world*

### Findings:

- It is clear that science is the primary driver in the proposal and performance evaluation but the building of state capabilities for future impact is also a second consideration. Thus the funded programs may initially focus on building of the state's scientific competitiveness, but with the expectation that the science results would create a program of international significance.
- The EPSCoR program continues to promote geographic equity and diversified capacity to leverage talent across the US.
- A good effort has been made to collect and document metrics for success of the EPSCoR program, such as reflected in past awardees receiving "regular" program grants and personal awards. This effort is commended.
- The evolution of EPSCoR PIs into PI roles in 'regular' DOE and other agency funded research programs is positive and reflects on the stature of the portfolio.

### Comments:

#### Recommendations: