



UNITED STATES GOVERNMENT
M E M O R A N D U M

DIRECTORATE FOR MATHEMATICAL AND PHYSICAL SCIENCES

Date: March 28, 2008
From: Assistant Director, MPS
Subject: **Response to the Division of Materials Research Committee of Visitors Report**
To: MPS Advisory Committee

Please find attached the MPS response to the Committee of Visitors (COV) report from the 6-8 February 2008 COV review of the Division of Materials Research. The review was thorough and insightful, and the findings will be very helpful to me and to the Division of Materials Research in fulfilling our responsibilities to the scientific community and to the nation.

The Division of Materials Research drafted the attached response, and I concur with its content. I therefore adopt it as the official response of the MPS Directorate. I hope the full MPS Advisory Committee finds this COV review and the MPS response useful and acceptable.

Tony Chan
Assistant Director

Attachment: Response to Division of Materials Research COV Report of 2008

Division of Materials Research (DMR) Response to
Findings and Recommendations of the DMR Committee of Visitors
February 6 - 8, 2008

The Committee of Visitors (COV) met on February 6-8, 2008 at the National Science Foundation to assess the performance of DMR in two primary areas: (a) the integrity and efficiency of the processes related to proposal review and (b) the quality of the results of DMR's investments in the form of outputs and outcomes that appear over time. The COV also explored the relationships between award decisions and program/NSF-wide goals in order to determine the likelihood that the portfolio will lead to the desired results in the future.

The committee's report consists of two parts as follows:

1. A summary of the COV's most important observations communicated to Dr. Michael Witherell, Chair, MPS Advisory Committee, by Dr. Paul Percy, Chair, DMR Committee of Visitors, on March 5, 2008.
2. The compiled findings of the COV in the form of report templates for the four DMR Program Groups as follows:
 - A. Metals, Ceramics, Electronic Materials.
 - B. Instrumentation, Facilities, Materials Research Science and Engineering Centers (MRSECs), Office of Special Programs.
 - C. Condensed Matter and Materials Theory, Condensed Matter Physics.
 - D. Solid State and Materials Chemistry, Polymers, Biomaterials.

I. Response to the overall comments of the COV

We are pleased that the COV finds that "...DMR is an exceptional Division within NSF, with highly respected and successful programs that are centrally relevant to the implementation of the recommendations of the American Competitive Initiative (ACI)..." The report also finds that "DMR is one of the leading divisions within NSF in investing in transformative research and in developing new concepts and new management strategies."

The Division was also lauded for its positive response to the 2005 COV report, including the addition of staff to relieve an excessive workload. A concern of the 2005 COV was that support for individual investigator program should not be diminished and the 2008 COV finds that "DMR has also been diligent in preventing the erosion of the fraction of individual investigator grants." The COV applauds the efforts of the Director in implementing diversity strategies for the Division and initiating international programs. The committee notes that "the process that DMR uses for determining which proposals to fund is excellent" Also, "DMR program directors do an excellent job of ensuring participation of underrepresented groups in their portfolios."

The followings are the key areas in the COV summary where DMR is encouraged to consider new approaches and improvements.

Staffing and Workload.

The COV continues to be concerned about staff workload issues. The COV summary states that “the staff is an enormously valuable resource, but program directors are burdened with an increasing workload without commensurate staff increase”.

Comparable concerns are raised in most of the separate program group reports.

RESPONSE:

Earlier in the summary the COV lauded DMR for staff increases to reduce workload. Indeed, two new program director and two new administrative support staff positions have been added since 2005. The program director positions cover the new Biomaterials Program and, the educational and outreach activities of the Office of Special Programs, respectively. In addition, the MRSEC program staff has been increased to three full-time and one part-time program directors. The administrative staff saw the creation of two new intermediate level staff positions. One administrative staff position is currently vacant and is soon to be filled. However, during this time of increased staffing there was a significant increase in the number of submitted proposals with the result that the workload during the past years remained approximately unchanged and at an unacceptably high level for both program directors and support administrative staff. DMR has submitted a personnel plan to the MPS Directorate with the following personnel requests: (1) that the current vacancy at the technical support level be filled immediately and permission granted for an additional program support position, (2) two new program director positions be added to DMR: one to relieve the excessive workload in the Condensed Matter and Materials Theory Program, and the second position to help manage the increasing complexity and size of DMR’s Office of Special Programs (OSP), including oversight of the International Materials Institutes and the growing Partnerships for Research and Education in Materials (PREM) Program. The vacancy (as of April 3, 2008) in the Solid State and Materials Chemistry Program is expected to be soon filled. Two candidates have been already invited for interviews in April 2008. In order to allow for a smooth transition period for this important position, the retiring program director, Dr. David Nelson, was invited and has agreed to serve on a part-time basis for one year to work with the newly hired program director. Meanwhile, Dr. Joe Akkara was appointed as Acting Program Director starting April 3, 2008 while waiting for this position to be filled by a new program director.

Support for Instrumentation

The COV summary states: “In the area of research infrastructure, there appears to be an equipment funding gap in the \$30K to \$100K range, and amount which is impractical to seek support for in unsolicited proposals. The COV recommends that DMR should consider how this might be addressed.”

RESPONSE:

DMR is aware that instrumentation requests less than \$100K are not eligible to submit to the Instrumentation for Materials Research (IMR) or the Major Research Instrumentation

(MRI) programs. DMR is in agreement with the COV that such requests are not appropriate for stand-alone unsolicited proposals and will look for a solution to fill this funding gap in instrumentation.

Balance Between Funding Modes and Support for Facilities

As part of its discussion on the balance between various funding modes in DMR the COV restates its interest for DMR not to reduce the support for individual investigator programs. As the COV notes, DMR has been able to retain current levels of support since 2005 and the Division seeks to do the same in the future. The COV notes that an important aspect of this issue is the degree of DMR support for Facilities. In particular, the COV questions why the operating costs for the National High Magnetic Field Laboratory are born at a 95% level by DMR and recommends that NSF/DMR “evaluate this situation”. The issue of not reducing support for individual investigators was also raised in several of the program reports.

RESPONSE:

Balance between funding modes.

The 2008 COV credits DMR with “having been diligent in preventing the erosion of the fraction of individual investigator grants.” Because of nearly flat budgets, this implies that the balance between funding modes has not significantly changed during the last funding period. In regard to the balance between funding modes the 2005 COV concluded that “...the group as a whole views the distribution of funds between these different sectors as roughly appropriate”. DMR continues to evaluate the balance between funding modes and is committed not to reduce the fraction of funding for individual investigators.

Support for Facilities

DMR is the steward (providing major support) for the National High Magnetic Field Laboratory (NHMFL) and has been a steward of high magnetic field science for a very long time dating back to the Francis Bitter Magnetic Field Facility at MIT. DMR is also a partner, providing partial support for neutron and light source facilities. The NHMFL is currently co-supported by the NSF Chemistry Division at an annual level of \$1.5M. Given current budget expectations which was renewed in 2007, DMR is hopeful that it will be able to meet its commitments over the 5 year award. However, it is essential that new partnerships be developed to help meet the increasing costs of running such large major user facilities. DMR has initiated and expects to continue, a dialogue with other NSF directorates (e.g., the Biological, Sciences Directorate) about potential co-support of NHMFL. There is precedence for such support for synchrotron radiation light sources that serve both the material and biological science communities. In addition, NHMFL has opportunities for other sources of funding. For instance, it is eligible to compete for large instrumentation grants through the DMR Major Research Instrumentation program (MIP). One large MIP award for magnet construction has already been made at another major user facility.

The COV’s recommendations to shift management of NHMFL to the Director’s level or to distribute it among NSF Divisions will be also considered. It will be explored among a

number of other potential options. The role of construction and support for major research light source facilities is currently a topic of intense discussion at NSF. An expert panel is currently working on advising the Mathematical and Physical Science Directorate on the opportunities and appropriateness for NSF to support the construction and operation of large next generation light source facilities. This panel organized a light source workshop early this year, will be visiting major NSF-funded University-based and DOE-funded light source facilities, and will write a report with its findings and recommendations. This report is due early this summer (2008).

DMR Program Taxonomy

The COV recommends that “DMR examine the program taxonomy of the division to see how well-aligned it is with the changing materials community.”

RESPONSE:

During the last 20 years DMR has tried to stay current, and align itself with the changing world of materials research and education. As a result, the following restructuring and changes occurred:

- (1) the creation of the Condensed Matter and Materials Theory (CMMT) Program. This was made possible by collecting current awards and future proposal submissions from other DMR programs into the current CMMT Program.
- (2) the creation of the Condensed Matter Physics (CMP) program, which was possible by combining the former Solid State Physics and Low Temperature Physics programs.
- (3) the creation of the Materials Research Science and Engineering Center program from the former Materials Research Laboratory and Materials Research Group programs.
- (4) the creation of the Biomaterials program, which was started from existing awards in related programs as well as from new unsolicited proposals.
- (5) the expansion of the Solid State Chemistry program to Solid State and Materials Chemistry.
- (6) the grouping of programs into “clusters” that proved useful for management and COV oversight purposes.
- (7) the scope and focus of the programs, often guided by National Academy of Sciences studies and reports from NSF held workshops, were changed. In addition, other changes and emphases were implemented by newly hired program directors that brought novel ideas and energy to DMR.

The key purpose for a taxonomy review of DMR is to determine the followings:

- (1) Does the taxonomy of DMR reflect the 21st century world of Materials Research & Education?
- (2) Based on this taxonomy, is DMR supporting frontier, cutting edge areas in Materials Research & Education? Are there any missing important areas of Materials Research & Education not supported by DMR?
- (3) To what extent does the DMR structure serve or does not serve the needs of the changing world of Materials Research & Education, and its community?

The DMR research and education community is very broad and extends from the traditional materials science and engineering disciplines to the frontiers of condensed matter chemistry and physics, to novel nanostructured and hybrid materials, and to new inter- and multi-disciplinary areas at the interfaces of the physical, chemical and biological sciences.

DMR will try to seek advice in this regard and will engage in a dialogue and discussions with its research and education community as well as members of the MPS Advisory Committee. The recommendations that the biomaterials, polymers and, solid state and materials chemistry Programs need to maintain their individual homes within DMR will be honored.

The Role of “Theory” in DMR

The COV summary recommends that “the Director examine the accessibility of theory to all areas of the DMR portfolio.”

RESPONSE:

The Condensed Matter and Materials Theory (CMMT) Program supports primarily proposals that are entirely theoretical or computational in nature, with a broad portfolio representing all areas of materials theory, and extends, through co-review, with other divisions and directorates. Proposals which have a theoretical component, but are based primarily on experimental research, are generally supported by other DMR programs, which include single and multi-investigator’s projects, research groups, MRSECs, user facilities, and institutes.

DMR director will review the theory program and seek potential improvements if needed in this regard. Renaming the Condensed Matter and Materials Theory Program to just Materials Theory will be considered. DMR will also ensure that this program portfolio will include areas such as biomaterials, polymers and, solid state and materials chemistry. DMR will look into hiring a program director, with both experimental and theoretical expertise. In addition, the possibility of co-review and co-funding between CMMT and other DMR programs will be re-examined and encouraged.

II. Response to specific additional issues raised in the program group reports

Issues raised in several program groups:

Broader Impacts

A.1.2 Are both merit review criteria addressed? (In MCEM and SSMC)

Even though the COV response is YES, there is a recommendation to further clarify what constitutes broader impacts. This same recommendation is repeated in section C.3.

RESPONSE:

In the summary statement the 2008 COV complimented DMR on “educating their community of reviewers through workshops and a ‘Dear Colleague’ Letter on the web.

The result is a significant improvement in the responsiveness (96%-level) of the reviewers to this issue.” DMR will continue to educate and mentor, in particular, new reviewers and principal investigators in the area of “broader impacts.” The DMR division director has reviewed, updated the “Dear Colleague Letter,” and included a more detailed description of the broader impact themes. This letter has been posted on the DMR website.

Representation of underrepresented groups in program portfolios and as reviewers of proposals

Although success rates for members of underrepresented groups are generally at or above the DMR average, several COV program reports urge that DMR continue its efforts to promote submissions from these groups. In addition, the COV urges use of reviewers from underrepresented groups, including primarily undergraduate serving institutions.

RESPONSE:

DMR is committed to enhance in its program portfolios the participation of those groups that are underrepresented in particular women, minorities and scientists with disabilities as DMR PIs, as reviewers, and as program directors. DMR has developed a diversity strategy that impacts all aspects of DMR both within and external to NSF. A working group on diversity was established in 2007, which continues to monitor DMR’s progress and approaches. This group recommends alternative practices whenever and wherever appropriate. For instance, a recent recommendation made by this group, and immediately implemented by the DMR division director, was the inclusion of a member of the diversity working group in each DMR search committee for new program directors. In another area, an increase in funding of the PREM program is anticipated. This program has and continues to be a powerful mechanism to increase the pool of potential PIs from underrepresented groups including women, minorities and scientists with disabilities. A PREM competition is planned for 2009 which could see an increase in the number of current awards. Another tool for enhancing participation from underrepresented groups will be implemented in FY08 which will take advantage of the (American Competitiveness Initiative) ACI Fellows program. The goals of this program include supporting projects that promise transformative research and identify outstanding candidates from underrepresented groups. An ACI pilot project has been initiated in DMR which will focus on rising stars and underrepresented groups. The creativity extension award was implemented in 2008, with a vision for extension in 2009 to include other modes of funding individual early career investigators, in particular women, minorities and scientists with disabilities.

Award Size and Duration

A.3.3. Are awards appropriate in size and duration for the scope of the projects? The COV response was NO/YES. One sub-panel concludes that “the size of the awards is often insufficient to carry out many of the projects at a reasonable level....As a result the scope of the project is reduced and/or experiments are limited, thus missing opportunities for important scientific discoveries.” Another sub-panel recommends that “DMR should consider longer term awards to reduce the burden on reviewers and DMR staff”

RESPONSE:

The increase in DMR award sizes for research proposals noted by past COVs has leveled off. Although annual median awards sizes for 2005 (\$111.7K) , 2006 (\$110.0K) , 2007 (\$117.7K) increased modestly, the mean annual award sizes decreased going from 2005 (\$133.5) to 2006 (\$127.8), and 2007(\$125.1). The mean award durations are also slightly decreasing at 3.50, 3.45, and 3.24 years for 2005, 2006 and 2007. The severe budget constraints facing DMR during this three-year period most likely account for these results. Over this same time period the overall success rate for research proposal has leveled off at near a historic low of 20%. DMR is committed to increase award sizes and duration periods provided that success rates will not be further reduced. This is only possible with the availability of increased funding. DMR division director promises to increase the size and duration of the most successful projects if FY09 requested budget materializes.

Support for New Investigators

Several sub-panels raise the issue of increasing the support for new investigators. For example, this issue is raised in the context of question A.3.7. Program Group B (centers, etc) responds that “the overall perception ... is that there is room for improvement in funding to new investigators.” The same sub-panel also praises the use of seed funding in MRSECs to support new investigators.

RESPONSE:

The success rate (ratio of number of awards to total number of proposal submissions) for new investigators is at historically low levels, and much lower than that for more established investigators. For the period 1998 – 2004 the average success rate for new investigators for all of DMR was 20%. For the past COV reporting period 2005 – 2007, the success rate for new investigators for all of DMR was 13%. DMR is committed to avoid further reductions of average success rates for new investigators, and its program directors will develop novel approaches to mentor new investigators so they can learn to write more competitive proposals.

A. Program Group for Metals, Ceramics, and Electronic Materials

Reviewer Balance

A.2.2 Did the program use reviewers balanced with respect to characteristics such as geography, type of institution, and underrepresented groups?

The response was YES, but the COV recommends that “to enable a more systematic analysis of diversity, it would be useful to collect data from a larger fraction of reviewers.”

RESPONSE:

The available NSF data base is limited because ~70% of the reviewers do not self-identify their gender, minority, and/or type of institution status. Some DMR program directors collect their own reviewer data, but this places a burden on their already high workloads. DMR director has tasked a member of the administrative unit with exploring

an efficient ways to collect this statistics, and he is already working with other NSF directorates that can help in this regard. Meanwhile DMR will also seek additional support personnel to collect other relevant data.

Portfolio Balance

A.4.6 Does the program portfolio have an appropriate balance considering, for example, award size, single and multi investigator awards, or other characteristics as appropriate for the program?

The response is “Appropriate” but the COV subcommittee urges that “the portion of individual investigator awards is nearing the lower advisable limit and, along with the acceptance rate of highly regarded proposals, needs to be monitored carefully for adjustments as future budgets permit.

RESPONSE:

DMR is fully committed to the balance between individual and group investigators, and other larger programs. The 2008 COV summary states that DMR was successful in this regard during the last review period. However, tight budgets have not allowed a significant increase in success rates across individual investigator programs. The current FY 2009 budget request may lead to significant increase in the number awards for individual investigators.

B. Program Group for Instrumentation, Facilities, MRSECs, Office of Special Programs

Partnering in Construction and Operation of Facilities

C.1. Comment on any program areas in need of improvement or gaps (if any) within program areas.

The COV states: “There are many strong programs within the area of review by this sub-panel. Of great concern is sustaining these excellent areas and growing their reach and scope of their success in the future. The sub-panel recommends that DMR consider increasing the role of partnering in the construction of instrumentation and operation at the facilities.”

C.3. Identify agency-wide issues that should be addressed by NSF to help improve the program’s performance.

The COV states that “Part of DMR’s remarkable success is due to its strong support of facilities. As this is a great financial responsibility, it would be reasonable to explore possibilities for distributed funding within NSF for construction and operations of unique facilities. Such partnerships are emblematic of the existing relationships between individual investigators and the instrumentation they need for frontier research. As operations costs escalate, a creative solution will have to be found or we risk the loss of these world-class capabilities.”

RESPONSE:

The discussion about facilities in the summary of the COV report reflected the perceived need to balance the DMR portfolio, i.e. individual investigator support should not be

jeopardized for the need to meet escalating support costs of major facilities. The sub-panel report comes to the same conclusion but highlights the need for facilities as being essential for advancing frontier materials research of individual investigators. Potential solutions have been discussed under the “Facilities” section of this response to the COV summary. This issue clearly extends beyond DMR to other MPS divisions and other NSF directorates. The MPS Advisory Committee is currently taking up this issue and a report is expected in the summer of 2008. Current expectations are that DMR will need to explore additional partnerships for support of large user facilities such as NHMFL. Initiation of an additional large scale project under DMR stewardship, such as a major new light source, will require very careful examination of the potential impact on DMR programs and capabilities.

Reviewer Selection

A.2.4. Additional comments on reviewer selection: The sub-panel recommends that “DMR should consider developing a mechanism for formal recognition of excellent reviewers. In addition, it would be helpful if it is possible to provide some level of reviewer training particularly for new reviewers. “

RESPONSE:

DMR programs have for some time established informal mechanisms for identifying new reviewers and for mentoring them. Possible new approaches focusing on underrepresented groups have been proposed by the recently established DMR diversity working group. DMR will examine the possibility of reviewer training, further mentoring and recognition.

Cost Sharing

C.1. Comment on any program areas in need of improvement or gaps (if any) within program areas.

This sub-panel of the COV commented on cost sharing: “The recent removal of cost sharing of up to 30% by universities (or the States) has affected DMR in a negative way. We understand that the NSB is looking at the possibility of reinstating it. After observing the effect of removal, this sub-panel would recommend bringing it back. Unfortunately, this would negatively affect minority-serving institutions, and a compensating process may be necessary in this area.”

RESPONSE:

Cost-sharing has had a primary affect on proposals submitted to the instrumentation, facilities, and centers programs. NSF has enacted changes for cost sharing for the Major Research Instrumentation solicitation but had not been extended to other programs. DMR is providing input when requested on the perceived impact of the removal of cost sharing and will continue to monitor the situation.

International Activities

C.1. The COV sub-panel comments on DMR’s Materials World Network Program (MWN) as follows: “This sub-panel of the COV recommends that the materials world

network be continued and broadened to include more research in Asia and Africa. We are pleased to recognize that DMR is already working toward this goal.”

RESPONSE:

We are pleased with the COV’s endorsement of this important and timely activity. The past results of encouraging research connections in Africa and Asia have been limited because of a variety of factors, which have not entirely been under DMR’s control. Recent personal contacts made with principals of funding agencies in these regions will be followed up and strengthened. Early numbers on proposal submissions look encouraging, but there is considerable room for improvement. Shortly after assuming her new position, the DMR division director traveled to Asia and later on to North Africa with the sole purpose of promoting collaborations between the USA, and these two continents. As a result numerous funding agencies from Asia and Africa were identified. Several of them agreed to participate in the MWN Program. New international activities such as jointly held workshops and summer institutes are being planned for the near future. For instance, a joint NSF-NSFC (China) workshop will be held yearly and, alternating between the USA and China. These workshops will focus on different hot topics in materials research. The first one will be on “Nanostructured Materials for Global Energy and Environmental Challenges,” and will be held this year (2008) in the USA.

C. Program Group for Condensed Matter and Materials Theory, Condensed Matter Physics

Annual Performance Goal - Time to Decision

A.1.7. The annual performance goal is that for at least 70% of the proposals the applicants are informed about the funding decision within six months of the proposal receipt or deadline date, whichever is later.

The COV notes that the CMP program met its goal in 2007 and was very close to the goal in 2005 and 2006. On the other hand, the CMMT program was close to meeting its goal in 2005 but not in 2006 and 2007. The COV attributes the problem with meeting the performance goal in recent years for and to deal with the number of proposals from an increasing broad array of sub-disciplines.”

A.4.1. Management of the program

The COV sub-panel notes that program management is strong but if trend of increasing number of proposals continues “more help will be necessary for both the CMP and CMMT programs”.

RESPONSE:

The CMMT program is very complex covering a large amount of the theoretical aspects of essentially all DMR programs and intersects with many other programs outside DMR and MPS. This makes program management inherently more complex and more time is required to handle each proposal. The newly created cyber-enabled discovery and

innovation (CDI) initiative required the expertise and participation of CMMT program directors.

In addition, the followings occurred within the last three year COV reporting period: (a) the number of proposals coming to the CMMT program increased dramatically(e.g., nearly 40% in 2006), (b) a long-time permanent program director retired in late 2006, leaving the program with only one person, and recruitment of a replacement took longer than expected.

Better planning to avoid this unnecessary gap will be undertaken in the future, and will also ensure overlap between leaving and incoming program directors in order to maintain continuity within a given program. Currently, there are two full-time (one permanent and one IPA), and one part-time program director. DMR is examining the work load for all programs and expects to make recommendation to MPS management concerning long term staffing needs. The proper staffing level for the CMMT program will be part of that recommendation. The current work load for CMP will also be studied and compared to other programs. Here again the complexity of the overall program plays an important additional role in relating workload beyond the mere numbers of proposals processed by the program.

Transformative Projects

A.3.4 Does the program portfolio have an appropriate balance of innovative/potentially transformative projects?

The COV sub-panel answered YES to this question, but pointed out that one panelist recommended “to set aside a small fraction of the budget for high risk/high pay-off projects, labeled that way from the start.”

RESPONSE:

DMR currently uses the Division Reserve as a means to encourage the funding of potentially “transformative” proposals on a 50% cost basis to the programs. Such proposals are coded because of the specific reserve action. Other potentially transformative awards can be supported by the current form of Small Grants for Exploratory Research (SGER). NSF has established a working group to study the possible revision of the SGER type grants. Such grants are currently coded and can be traced over time. DMR will take the sub-panels recommendation into consideration for a more uniform coding of other potentially transformative awards. DMR will also reexamine the extent of support of present individual investigator projects and MRSECs with regard to transformative and high-risk type research.

Study of Individual/Small Group Funding Modes

C.3. Identify Agency wide issues

The sub-panel recommends that NSF consider “studying the effectiveness of the individual/small group funding mode, similar to the NAS/NRC study of the MRSEC funding mode”. Such a study “could help to elucidate the “right balance” between individual/small group funding and center- (and solicited) oriented funding.

RESPONSE:

DMR will explore interest of other divisions in such a study. Some information on the relative impact of center and individual grant support is available from the above cited MRSEC NAS study. It is generally agreed that balanced support for individuals, small groups, instrumentation, centers and facilities is essential for support of a modern research enterprise. The exact balance between funding modes will be reexamined under this light.

Liquid helium shortage

C.3. The COV sub-panel points out that a world-wide shortage of helium has developed over past several years. The COV is very concerned that this is impacting a large number of investigators. A positive response from DMR to help alleviate the situation would be appropriate.

RESPONSE:

DMR is very much aware of this problem which is primarily affecting the condensed matter physics community. CMP program directors are researching the overall impact on awardees in their portfolio and make recommendations to the division for possible supportive measures.

Other alternatives to liquid He such as close-cycle refrigerators whenever and wherever appropriate will also be explored.

D. Program Group for Solid State and Materials Chemistry, Polymers, and Biomaterials

Biomaterials

A.4.1. Overall quality of the research and/or education projects supported by the program.

The sub-panel responds to the above question as Appropriate and adds that for the overall program group “The quality was exceptionally high”. But, the panel recommends that for the BMAT program “the research funded is not uniformly high-risk innovative research.” The panel adds that “however, this is a new program in a state of evolution and its quality will certainly improve in time, given the number of investigators interested in the subject. Because of the vitality of the field, it is important to pay specific attention to funding cutting edge, novel ideas and reduce support of incremental improvements on biomaterials systems that are well known and even utilized”.

C.1. Comment on any program areas in need of improvement or gaps (if any) within program areas.

The sub-panel stresses that “research in this field will create new opportunities in technological innovation related to health, energy, national security, and protection of the environment. Innovation in these areas will not be possible without our fundamental understanding of the underlying principles in the formation and function of biological materials. The value of this rigorous approach to materials has been widely appreciated in traditional areas of materials science, and must now be extended to biomaterials.”

RESPONSE:

We are in full agreement with the COV assessment that the fraction of support of “high-risk innovative research” proposals should be increased. BMAT program directors will work closely with DMR program directors and management, to create and ensure a Biomaterials Program that is noted for its world-class, cutting edge research and education. In addition, DMR has made a commitment to substantially increase the current investment in the Biomaterials program initiated in 2006, and expand the scope of the program to include the frontier, cutting-edge areas of biomaterial research.