

Minutes
MPS Advisory Committee Meeting
April 7-8, 2011
National Science Foundation

Thursday, April 7, 2011
Morning Session

Welcome and Introductions

Dr. James Berger, Chair of the Mathematical and Physical Sciences Advisory Committee (MPSAC) opened the meeting at 9:00 a.m.

Dr. Morris L. Aizenman, Senior Science Associate of the Directorate for Mathematical and Physical Sciences (MPS) introduced the Chair of the Mathematical and Physical Sciences Advisory Committee (MPSAC), Dr. James Berger of Duke University. Dr. Berger welcomed committee members and asked committee members and MPS senior staff to introduce themselves. He discussed the agenda noting that a major part of the morning would be dedicated to discussing the reports from the Division of Astronomical Sciences Committee of Visitors and the Division of Material Sciences Committee of Visitors. The committee would need to accept or reject the reports, providing comments on the reports as appropriate. A designated reporter would be needed for each afternoon break-out session who would report back to the committee in the late afternoon. Unlike previous meetings, instead of committee members posing questions to the NSF Director, Subra Suresh, the committee would be engaging Dr. Suresh in discussions regarding the break-out session reports. One committee member suggested that all involved parties read the white papers before beginning the break-out discussion to eliminate time on summarizing each paper, as well as suggesting the use of PowerPoint for presenting findings to Dr. Suresh during discussions. Berger then asked Dr. H. Edward Seidel, the Assistant Director of MPS, to address the meeting.

Remarks by MPS Assistant Director

Dr. Seidel began by noting that the President and both political parties support basic research and have made it clear that science, and NSF, are still priorities of the federal budget. He noted that discretionary spending is currently frozen and the previous expectation, that spending would double, is now uncertain. He noted that Dr. Subra Suresh, NSF Director, aims to unify NSF (OneNSF) to support interdisciplinary challenges and improve organizational efficiency.

Regarding the customary report on spending, Seidel noted that without an appropriated FY 2011 budget at this time he was unable to comment on such spending. If there are cuts made to the budget once the federal FY 2011 budget is approved, such cuts will have to be enacted in a short amount of time.

Seidel noted several science highlights from the divisions of MPS, including the Physics highlight on the Large Hadronic Collider (LHC) that continues operation; the Astronomy Atacama Large Millimeter Array (ALMA) that Seidel visited in early October; the Materials Research First Quantum Machine that was noted in Science Magazine as being the highlight of 2010; the Mathematical Sciences Model of Nanoscale Pore Formation; and the Chemistry Molecular Self-Assembly on Graphene.

The total NSF budget request for FY 2012 was \$7.67 billion, with MPS having the largest request (\$1.43 billion) of all the directorates. Due to the five very different divisions in MPS, however, it was difficult to articulate 'top priorities' of this budget. He welcomed ideas and suggestions from the Committee on the white papers regarding funding priorities. He also noted that the white papers have led to cross-directorate participation. There was an overall 6% increase in the MPS request, and a 16% increase for individual investigator award (IIA) programs in the FY 2012 budget. Budget requests for facilities and education were reduced and will be discussed in the break-out sessions. Overall, NSF's request supported NSF-wide and national priorities to enhance multidisciplinary research, to advance a strong scientific and technical workforce, and to invest in facilities critical for fundamental research.

Seidel updated the MPSAC on large facilities. IceCube was completed in December and continues data collection, as does the Laser Interferometer Gravitational-Wave Observatory (LIGO). The National Science Board (NSB) did not approve the award continuing the Deep Underground Science and Engineering Laboratory (DUSEL). The NSB stated that management of this project aligned more with the Department of Energy. NSF is now in discussions with DOE to continue the support of this project. Seidel also discussed FY 2012 budget requests for continuing programs including the Science, Engineering and Education for Sustainability (SEES) investment area. MPS requested \$160 million to support this effort; two of the most important MPS foci on SEES are Sustainable Energy Pathways (a collaborative effort with the Engineering Directorate), and Sustainable and Renewable Materials in Chemistry. All MPS divisions would be participating in FY 2012. The Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21) was announced in the President's budget; MPS is requesting \$20 million with NSF requesting a total of \$117 million. With respect to data, questions remain as to how to remove boundaries and incentivize sharing and creating data policies. A recent workshop with the NSB was held to discuss these details. For example, if an article is published in a journal and a reader of that article requests particular data pertaining to that article, does the researcher then have to provide this requested data? Data management plans have been required of all proposals as of January 18, 2011. The NSB is examining policies for access and openness. Seidel highlighted additional FY 2012 MPS budget requests for the Biological, Mathematical, and Physical Sciences (BioMaPS) program, with \$25.75 million requested, and the Science and Engineering Beyond Moore's Law (SEBML) activity (\$42.18 million). MPS recently partnered with the Directorates of Engineering (ENG), Computer and Information Science and Engineering (CISE) and Social, Behavioral and Economic Sciences (SBE) to provide the Enhancing Access to Radio Spectrum (EARS) program for cross-cutting research in efficient use of the radio spectrum. There was a requested \$1 billion to be budgeted over the next five years for this program, which responded to the national broadband priorities. In support of multidisciplinary research, MPS requested an increase in the budget of \$5 million.

Seidel provided a staffing update noting that all positions for Division Directors in MPS have been filled. The search continues for the permanent Deputy Division Director for the Division of Chemistry, and a search was recently initiated for a Deputy Division Director in the Division of Mathematical Sciences.

In the discussion following Seidel's presentation, one MPSAC member asked whether or not research networks were present in MPS. Seidel responded that there has been discussion to have more research networks in MPS and he welcomes suggestions for achieving this goal. Another question posed was whether or not NSF planned to be responsible for storing all scientific data. Seidel said that this would not be the case, but NSF is helping in beginning a national data infrastructure with other agency involvement. There was some concern expressed regarding the far-reaching impact of the NSB's decisions on science, especially regarding the DUSEL decision. Seidel responded that their decision was not to imply that the science was not fundable, but that other agencies should take on this responsibility. One MPSAC member asked if there were mechanisms for soliciting input from other communities, such as industry or venture capitalists. Discussions have taken place in such environments as Chief Executive Officer (CEO) summits, but this question could be posed to the Director in Friday's session. There was a comment from an MPSAC member that there appeared to be common elements between DUSEL and other MPS projects. What could the MPSAC do to help educate the NSB. Seidel responded that DUSEL was a special circumstance and a judgment call on which organization should manage such a project

Report of Division of Astronomical Sciences (AST) Committee of Visitors

Dr. Joel E. Tohline, Chair of the Division of Astronomical Sciences Committee of Visitors (COV), presented the report. He began by providing a summary of the finding of the COV. The COV was pleased with the discovery and learning outcomes reported by AST for the past 3 years. It found that such outcomes advance fundamental understanding. The COV commends the managerial accomplishments of the staff over the past 3 years, and feels that efforts in AST have been driven by scientific objectives, goals set by the community, and a balance of fairness. The staff has

accomplished many objectives under high levels of stress. NSF needs to address the issue of staffing levels. With respect to budget balance, there is healthy stress between facilities and individual investigator awards, with more than half of the AST budget going to facilities (this includes both operations and design and development costs of future projects). He commented that the community was completely behind the recommendations of the National Academy of Sciences Decadal study *New Worlds, New Horizons in Astronomy and Astrophysics*. With respect to major facilities, he noted that construction costs for facilities come from a separate budget from that of AST, but operational funds for facilities have to be provided by the divisional budget. Operational costs are provided for the National Radio Astronomy Observatory (NRAO), the National Atmospheric and Ionosphere Center, (NAIC), the National Solar Observatory (NSO), the Gemini Observatories, and the National Optical Astronomy Observatories (NOAO).

Tohline then turned to a discussion of ongoing, future, and new projects that are within AST. Construction of the Atacama Large Millimeter Array (ALMA) in Chile is almost complete, and science commissioning is underway. Funding has been provided for construction of the Advanced Technology Solar Telescope (ATST) in Hawaii. The ATST will be the largest US public access solar telescope constructed in the past 30 years, and operations should begin by the end of the decade. The Large Synoptic Survey Telescope (LSST) will be located in Chile, and its construction is the highest priority for ground-based astronomy in the Decadal Report. The telescope will have a nominal 10-year lifetime, and will process massive amounts of data on a nightly basis (30 terabytes per night). There are also two projects involving the construction of giant optical telescopes, with two projects competing for support.

Tohline concluded his discussion with nine key recommendations made by the COV. The COV felt that AST should conduct a thorough review of present and planned programs and activities (portfolio review). AST should consider establishing, with community input, metrics that can be used to measure the success of its programs. The Advanced Technology Solar Telescope (ATST) needs to find its best programmatic home within NSF and this should be decided before AST conducts its portfolio review. AST needs to determine whether or not to invest in design and development (D&D) costs for the Giant Segmented Mirror Telescope (GSMT). AST and MPS/NSF should develop a realistic plan for decommissioning instruments and phasing out the maintenance and operation costs. The COV finds that AST lacks sufficient staff to deal with its current responsibilities.

With respect to reviews of proposals, AST should consider options to significantly expand the pool of panelists who do such reviews. It should establish the expectation that past recipients of awards should participate in the review process. With respect to the Electromagnetic Spectrum Management activity, there is a need to protect portions of the spectrum essential to radio astronomy, but there is also the question of the proper home for this program – where should it be located within NSF? The program needs to retain a high profile within NSF.

In summary, the COV felt that with additional funding AST is well-positioned to accomplish great things. Also, the COV is very pleased with the senior management within AST.

In the discussion that followed Tohline's report, there were comments concerning the future home of the ATST. Most of solar physics is supported in the Geosciences Directorate (GEO). While the science expertise lies in GEO, AST has the knowledge and experience needed to operate an astronomical facility. It was felt that the difficulty AST is having in recruiting reviewers means that MPS needs to do something to encourage more people to review; it should recognize and promote those who serve – for example, at NIH those who review receive certain advantages as to when they can submit proposals. With respect to support for midscale projects that were highlighted in the Decadal Survey, a question was raised as to why this was not discussed in the COV report. The response was that this was not highlighted in the 2011 COV report because it was already discussed in the 2008 COV report, and the 2011 COV only examined AST's progress over last 3 years. In this regard, AST was already making progress in this area and the COV recognized this progress. It was noted that tension does exist between support for the individual investigator programs (IIA) and support for facilities, and the balance between the two is important. AST understands the concerns and the

difficulties of not having enough resources to keep the grants portion of the budget growing and that providing resources to do new things and honor past commitments will require creative solutions.

The MPSAC unanimously accepted the AST COV Report.

Report of Division of Materials Research (DMR) Committee of Visitors

Dr. Murray Gibson, Chair of the DMR COV, began by congratulating the staff of the DMR for its activities over the past three years. The program directors were doing an outstanding job, and the COV was pleased to see that the success rate of the IIA program was being maintained at 25%, with this being even higher with respect to young investigators. The program has a record of effective stewardship.

The DMR had four recommendations which it wished to bring to the attention of MPS and the community.

With respect to instrumentation and facilities, the COV expressed concern about the balance of funds between the two. The COV felt that funds should be made available for instrumentation at all levels (especially in the range of medium to smaller scale). The size of this budget appeared to be satisfactory, but NSF should develop a facilities stewardship strategy.

There is an NSF-wide problem with respect to the Broader Impacts review criterion. The COV felt that the broader impacts sections of proposals are not consistently reviewed or assessed. The COV recommends that clearer guidelines (not simply a list of acceptable activities) be put in place and required for principal investigators (PI), reviewers, and institutions. The COV was emphatic in noting that the responsibility for broader impacts remain with the individual PI, but institutional support for outreach activities should be provided.

The COV had a specific recommendation with respect to the organization of DMR with respect to its current placement within MPS. It recommended that a Material Sciences Directorate be established within NSF, but NSF, in doing so, should be careful to preserve all of the activities and processes within DMR that are currently highly successful ("don't break what works now").

The COV felt that DMR staffing should be increased to reflect the size of its budget (the largest in MPS) and its responsibilities. Data supporting this recommendation is included in the report.

In the discussion that followed Gibson's report Dr. Luis Orozco commented on the recommendation concerning instrumentation and facilities. He strongly endorsed the recommendation. Dr. Dennis Matthews endorsed the broader impacts statement, particularly the recommendation concerning PI accountability. Dr. Daniella Bortoletto commented on instrumentation and facilities. She suggested that there exists a model in Europe for funding of shared facilities and this should be considered. Gibson agreed and felt this should be investigated. Dr. Fred Roberts commented on broader impacts. He felt that the Broader Impact criterion and its associated problems need to be addressed and corrected. Dr. Sharon Glotzer asked why a Directorate for Materials Research was required now. Gibson responded that the COV had addressed this issue in response to a request from Seidel. The COV conclusion was that a new directorate would provide more coherence for materials research infrastructure. Matthews commented that "SEES is the Manhattan project for chemistry". Sustainability is the top priority for the chemistry community.

The MPSAC unanimously accepted the DMR COV Report.

Report on the MPS/ENG Clean Energy Workshop

Dr. Esther Takeuchi reported on a joint MPS and ENG Clean Energy Workshop that was held at NSF on March 15, 2011. In making this presentation she wished to update the MPS on activities conducted by MPS and ENG on energy as well as report on the workshop itself. She expressed her thanks to

Linda Sapochak (MPS) and George Maracas (ENG), they being co-chairs of the joint MPS/ENG working group that organized the workshop.

Tekuchi began by noting that this joint MPS/ENG working group had representation from each of the Divisions within the two directorates. The charge to this joint working group was to respond to the Office of Management and Budget requests, to prepare a 5-year Strategic plan for the Energy section of SEES, to maintain updates of MPS & ENG energy-related awards and activities, and to maintain updated information on specific internal and external energy-related areas relevant to NSF for use by MPS & ENG Directorates. During the past 6 months the working group had created an inventory of energy-related support in the two directorates and planned an internal workshop (retreat) on clean, sustainable energy.

The purpose of the retreat was to effectively frame MPS/ENG clean, sustainable energy activities into the SEES mission. The structure was to distill community and NSF ideas (external and internal survey data) into science & engineering, innovation, socioeconomic and education challenges; to identify existing strengths and synergies (NSF and external); and to develop new strategies to address the challenges. The output of retreat was a prioritized list of challenges and strategies relevant to NSF towards accelerating a clean sustainable energy future.

Takeuchi then described the methodology of the retreat. Questionnaires were distributed both internally within the two Directorates and to selected members of the external community. Members attending the retreat were split into four areas, with the task of identifying existing strengths and addressing new strategies in science and engineering, innovation, socioeconomics, and education. An underlying principle was to use earth-abundant, environmentally-benign, sustainable resources in an economically viable way and to ensure security and safety across the entire life-cycle.

In terms of science and engineering challenges, the retreat identified the areas of energy generation, systems design & integration of alternate energy sources, energy storage, energy transmission and distribution, and energy use and conservation. Innovation challenges were the integration of market-pull into research-push, the development of a common frame of sustainability metrics, the need for system-level thinking, the need to foster strategic partnerships, and the need for innovation in government policies.

In terms of socioeconomic challenges it would be necessary to create a sustainability research community that includes physical science, engineering, economics, biological and social/behavioral sciences participants, to promote a systems-level awareness in developing research and education programs to address sustainable energy issues, and to provide effective education and promotion to the public of the acute need for sustainable energy solutions.

Education challenges included the need to integrate into the mindset of science and engineering students the socio-behavioral- economic realities; to train science and engineering students to communicate better to the public, to balance depth with breadth in clean sustainable energy training programs at the undergraduate and graduate level, to incorporate clean-sustainable energy topics into the education curriculum of K-12 and undergrad students, and to understand the needs of industry, government, non-profit, *etc.* when designing new clean sustainable energy curricula.

The retreat noted that there were cross-cutting themes that appeared in all of the challenges. It was important to foster systems-level thinking, to engage the SBE Directorate as a stronger partner in SEES planning, to recognize that one had to build a sustainability community, and that one had to develop better mechanisms for information flow among communities addressing sustainable energy systems challenges. Also, one had to train scientists and engineers to function in diverse, interdisciplinary settings and effectively communicate with the public and policymakers.

Next steps for the group were to create a strategy for how ENG/MPS can frame clean, sustainable energy under SEES, to quantify strengths, weaknesses and opportunities in the NSF investment portfolio, and to articulate these in a 5-Year plan.

During the discussion period that followed this presentation Dr. Geoffrey West commented that these were indeed critical issues but he felt that none of the items mentioned in the presentation could take place within the present NSF structure. Takeuchi was in complete agreement about the criticality of these issues. Matthews expressed amazement at the level of ignorance of Congress/staff concerning technical aspects of energy issues. Dr. Elsa Reichmanis echoed this previous point and noted that education/understanding is a two-way street.

Report on the ERE-AC Meeting

Dr. Fred Roberts reported on the Advisory Committee for Environmental Research and Education (ERE AC) meeting that took place March 16-17, 2011.

The AC-ERE was founded in 2000 and, up until 2010, its primary job had been interpreted to be “advocacy” for the topics it deals with. *Now, with substantial new initiatives at NSF on environmental research and education, the role of the ERE AC is moving from advocacy to implementation.* This new role will require rethinking of the tasks of the committee. The new NSF Initiative SEES (Science, Engineering & Education for Sustainability) has become a highly visible and significant part of the NSF endeavor – and this puts a new responsibility on the ERE AC.

With respect to environmental research and education at NSF and the US, there are three relevant key components of administration priorities: environment, education, and the economy. There is a need to protect the US from economic/strategic risks from dependence on foreign oil and corresponding climate change, and the National Science Board (NSB) has stated that NSF should emphasize sustainable energy technologies.

Current OMB/OSTP FY 2012 priorities include the need to reduce dependence on energy imports and to curb greenhouse emissions and the need to develop a disaster-resistant America (earthquakes, tsunamis, hurricanes, human-caused disasters). Relevant NSF initiatives in this area include SEES (\$998 million in FY 2012 (> 10% of NSF budget); Cyberinfrastructure Framework for 21st Century Science & Engineering (CIF21) (\$117 million in FY 2012); and BioMaPS (Research at the Interface of the Biological, Mathematical and Physical Sciences) – integrating research to lead to new theoretical/experimental techniques for clean energy & advanced manufacturing (\$76 million in FY 2012).

Much of the discussion of the meeting centered on the new NSF SEES Initiative. There was also a panel from NSF that discussed current plans for SEES. SEES began in FY 2010 with a different name: “Climate Change Initiative.” This included five major FY10 climate research programs: Dimensions of Biodiversity; Water Sustainability and Climate; Ocean Acidification; Decadal and Regional Climate; Prediction Using Earth System Models; and Climate Change Education. While MPS in FY 2010 was only involved in the Earth System Models initiative, it was clear from the discussion that MPS disciplines are relevant to all five initiatives.

In FY 2011 emphasis would be on energy, scientific workforce needs, and the integration of energy and climate. One would engage the social, natural, and engineering sciences in collaborations and interdisciplinary networks and enhance public literacy on sustainability.

The FY 2011 NSF Dear Colleague Letter (DCL) to the science community discusses research on energy-environment-society; data analysis and visualization; decision support; research enabled by observational networks; workforce development; and coupled natural and human systems. FY 2012 emphasis will be in the areas of sustainable energy pathways; integrated science & engineering research; The PIRE (Partnerships in Int’l Research & Education) that will be exclusively devoted to SEES, a DCL, and postdoc fellowships devoted to sustainability.

Other items brought up at the ERE AC meeting included the increasing interest in cross-agency collaboration and international collaborations. The meeting also discussed the CIF21 initiative, and

there was a panel discussion about the involvement of SBE with SEES. Roberts noted that there are clearly opportunities for MPS/SBE interconnections here.

In the discussion that followed the presentation, Dr. Irene Fonseca commented that she is a principal investigator (PI) for one of the only two projects in Mathematical Sciences funded through PIRE and there is the possibility that she will be the last one from mathematical sciences. She expressed some concerns that this change in focus of the PIRE program to SEES could completely eliminate a wide range of research projects that can build international collaborations. Dr. Sastry Pantula noted that PIRE is very competitive and he has encouraged the mathematical science community to compete. He pointed out that DMS has also invested in SEES and hoped that the mathematical science community would get involved. Seidel commented from his own experiences on international collaborations and felt there were serious needs in supporting such activities. Dr. Mike Norman commented that it is a challenge for NSF to tackle this problem with three-year awards. Seidel responded that it takes time to establish a network involving different disciplines. Roberts explained that it was not expected that the problems can be solved within 5-10 years. This is also the case for SEES. A more difficult problem will be how one measures the success of these programs. Success should include discoveries in new sciences, and some real applications to practical problems. West commented that there should be centers similar to Los Alamos addressing these problems and that the nation was not taking these problems seriously enough. He felt that this should be an MPS priority. He did not feel the actions taken by NSF to date had been bold enough and a larger framework was needed. MPS needs a bigger framework.

Lunch Adjournment Followed by Divisional Breakout Sessions

MPSAC members had lunch with the MPS Divisions in the divisional breakout sessions.

Thursday, April 7, 2011

Afternoon Session

Reports from Divisional Breakout Sessions

Division of Physics (PHY)

Bortoletto began her discussion by commenting on the Basic Research (BR) White Paper. She noted that it would be discussed the following day but she emphasized that BR underpins clean energy and advanced manufacturing themes, only with a longer time horizon. She reported that AC members wish to reaffirm that basic research is at the foundation of the agency's mission and that the funding of basic research needs to be increased to maintain this important strength.

Midscale Instrumentation is needed by all divisions with experimental programs. It is important to avoid a "one-size-fits-all" approach. She noted that PHY needs to build such a program, and had started such a program a few years ago (called Accelerator Physics and Physics Instrumentation, APPI). PHY said it would increase the funding of APPI by \$2 million even in a bad budget situation, that instrumentation would have to be associated with reviewed proposals, and that APPI funding would capitalize instrumentation but operations would be handled by the relevant disciplinary program.

MPSAC members were concerned that new focused solicitations are taking resources from existing research with similar goals and encouraged MPS to avoid short-term investments for long-term goals. The example given was the development of the multi-tier system to handle LHC data distribution and analysis.

Norman commented that the LHC has developed its own infrastructure needs. Does it need a partnership with the Office of Cyberinfrastructure (OCI) to sustain it? Dr Joseph Dehmer responded that partnerships among OCI, PHY and other areas are currently sustaining this infrastructure, and this will need to continue. Seidel added that NSF is working on integrating the Open Science Grid into the CIF21 plan, and looking at AST and PHY as sciences drivers to get integration into the effort.

Division of Materials Research (DMR)

Reichmanis presented her summary in the form of seven recommendations from the AC members:

Recommendation 1 – Midscale Instrumentation: Midscale instrumentation should be made a larger share of facilities/instrumentation funding, to include \$30 thousand to \$10 million and greater. Shared facilities should be considered, and there needs to be an overall facilities stewardship strategy. There are cases where other parts of NSF should support facilities. An earlier COV recommended elevating facilities to the Director's Office, but the last COV did not reinforce this idea.

Recommendation 2 – Broader Impacts: Broader Impacts are not consistently looked at by program directors, principal investigators, and panels. AC members suggested that there needs to be better explicit agreement on the meaning of broadening impacts. First, program directors need a consistent view and then one must educate PIs. A Dear Colleague Letter (DCL) may be the most effective way, but should be combined with talks at workshops and other meetings.

Recommendation 3 – Materials Oriented Directorate at NSF: AC members recommended a reorganization that must be consistent with DMR's scope and organization. The internal structure of DMR is well matched to the concept, but there needs to be a working group study.

Recommendation 4 – Staffing: Staffing should be increased to reflect budget and responsibilities, including centers, facilities, and PIs. DMR is understaffed, and this could be more clearly articulated.

Recommendation 5 – Balance Among Modes of Support: There needs to be better balance between modes of support, e.g., PIs, centers, teams, instrumentation, and facilities, in order to prevent erosion of PI support. There is a need to maintain a strategic balance.

Recommendation 6 – Instrumentation Networks Needed: There is a need for instrumentation networks. DMR has MRSECs, but there could be a broader strategy for instrumentation; and DMR will look at this issue.

Recommendation 7 – Increasing Diversity of Pool of Applicants: There needs to be an increase in effort to increase the diversity of the pool of grant applicants, both women and under-represented minorities, for everything from MRSECs to principal investigator grant applications.

Dr. Eric Cornell asked what benchmarking diversity meant and Reichmanis responded that it meant that an effort should be made to document what exists, e.g., what are the evaluation methods available, and what are the data sources in the field? Dr. Barbara Finlayson-Pitts commented that she had received a survey on broadening impacts from the NSB. Seidel commented that with regard to reorganization he wondered whether we should have an MPSAC working group and involve other ACs, not just within DMR. Reichmanis responded the we need a broader, multidisciplinary working group.

Division of Chemistry (CHE)

Dr. Sharon Neal reported on the CHE breakout session. AC members were heartened by the big increase in the budget. They felt that there is a need to manage the (American Recovery and Reinvestment Act of 2009 (ARRA) variation in budget levels and were pleased that the Chemistry Research Instrumentation and Facilities Program (CRIF) funds were reallocated to cushion PI support. They noted that the staff is overworked, and discussed the pros and cons of going to a single submission window, which is better for sharing, but also raises some concerns. They were excited about SEES, but the Research Coordination Networks (RCN) creates concerns about cultural issues. RCNs do not support graduate student stipends, so this causes concerns when scaling up. They were also concerned about constraints caused by solicitation. Much of the time at the breakout session was spent on strategic planning to increase, leverage, and grow the chemical sciences.

Division of Mathematical Sciences (DMS)

Fonseca stated that NSF is THE source of Math support, and went on to discuss three topics: DMS and Working Groups; strategic plans; and budget and specific programs.

Direct Involvements in Working Groups: With respect to the Energy Working Group, there has been a workshop on math challenges for sustainability and with respect to the Basic Research Working Group, DMS has a huge role in energy, materials, climate change; but how this will resonate outside of MPS is not clear.

Strategic Plans: The NSF 2006 – 2010 Strategic Plan contained a bullet specifically on mathematics, but reference to mathematics is harder to find in the 2011 – 2015 Strategic Plan. Is this a concern?

Budget and Specific Programs: The AC members had a number of observations/comments to make in this area. DMS has a big role in SEES, but the solicitation is not enticing to the community. With respect to SEBML, there is a need to invest in algorithms. New computer architecture will not succeed without new algorithms. BioMaPS coincides with increasing interest in biology by the math community. In CIF21, the role of DMS should be enhanced through a stronger research component versus infrastructure.

Regarding education, unfunded excellence will impact young researchers the most. Excellent RTG (Research Training Grants) are pending or have been declined. Since DMS has no facilities, funding is needed for training in research. Tuition and stipends for graduate students may need to be reduced for budgetary reasons, and many are moving to Europe. Thus, there is a need for more NSF postdoctoral awards, more CAREER awards, and increased numbers of graduate fellowships. International networks provide for international experiences, collaboration, and mobility of trainees. While there are PIRE awards and SEES plans, there is no plan B.

With respect to staffing, the situation in DMS is bleak because there is no Deputy Division Director, the number of proposals is near 3000 per year, and DMS is severely understaffed. Four new FTEs and administrative staff are needed.

Seidel commented that mathematics-biology postdoctoral awards would encourage people changing directions and the availability of convertible postdoctoral awards, such as those made by the Wellcome Trust might be needed. Fonseca responded that it was not clear if the job market or the migration to mathematics-biology was the bigger effect.

Division of Astronomical Sciences (AST)

Dr. Suzanne Hawley reported on the AST breakout session. She said since the AC just heard the AST COV report, she would confine her report to a few observations/comments from the breakout session.

The AC members are pleased with the new personnel within AST, but found that the staff is very overworked. The AC was pleased with the new Division Director, Dr. James Ulvestad, and they found him to be forward looking and articulate in moving forward on the Astro2010 report. The breakout AC members endorsed the COV report. The MPSAC members felt that there is a need to decide on a home for the ATST and the National Solar Observatory (NSO) as soon as possible. The headquarters for NSO is being competed by the Association of Universities for Research in Astronomy (AURA) (and not by NSF) but if ATST is transferred to GEO then GEO may own NSO. ATST impacts the AST budget significantly, and so it is important that a decision on the home for ATST be made soon. The AC members are not taking a position on the home for ATST, but do want a decision.

The stagnant AST budget is a major issue, and while it is hard for AST to participate in SEES, AST does have a role in CIF21. The group agrees with the PHY AC members on the importance of basic research. LSST must proceed to preliminary design review (PDR) as soon as possible in order that it be ready to take advantage of the MREFC account. AC members understand the concerns about the budget profile and that operationally LSST must be accommodated in the AST budget, and it is the highest priority for AST.

It is important that AST undertake a portfolio review, consider midscale needs and closures. When it comes to closures, the funding of closures needs higher level consideration.

In closing her report, Hawley asked the full MPSAC to endorse the portfolio review as a subcommittee of the MPSAC.

Following the Hawley presentation, Platz stated that a century ago 50% of children died and this situation did not exist today because of, for example, research on polio, and all of this research was driven by societal problems. He expressed resentment with the emphasis on basic research, when research aimed at societal needs has been so important throughout history. Hawley responded that she did not mean to imply that there were not many payoffs from directed research, but much fundamental research had benefited society, even though it was not targeted in that direction. Roberts commented that fourteen mathematics institutes are planning programs on sustainability of planet earth. It was also necessary to look beyond Earth, and that is a role for AST. Seidel commented that it is healthy to have discussion on this. The MPSAC can bring up basic science, LSST, and design and development costs with the Director.

AST Portfolio Review Committee

A discussion ensued about creation of a subcommittee for a portfolio review for AST. Ulvestad commented that creation of such a subcommittee would be covered under the Federal Advisory Committee Act. DeSimone wondered whether it should have a broader view, e.g. over MPS. Hawley responded that the AST AC breakout group members wanted to focus on AST. Seidel asked if additional reviews of this type should be done for other Divisions, and DeSimone responded that this would be worthwhile. Aizenman commented that a similar suggestion had been made when AST undertook its Senior Review, and at the time it was concluded that the regular COVs fulfilled that function during normal operating conditions. The portfolio review should have at least one member of MPSAC, but it not be comprised entirely of MPSAC members. Cornell felt that since AST wishes to carry out this portfolio review, the MPSAC should help.

APPROVED – There was unanimity amongst the MPSAC members that a subcommittee of the MPSAC be formed to conduct a portfolio review of AST.

Preparation for Meeting with NSF Director and Acting Deputy Director

The discussion then turned to preparations for a meeting with the Director and Deputy Director the following day. It was decided that there would be short presentation by members of the MPSAC on each of the 9 white papers the MPSAC had developed and there was discussion on how such presentations should be made.

Adjournment

The meeting was adjourned at 6:00 P.M.

Friday, April 8, 2011

Morning Session

The MPSAC convened at 9:00 A.M.

Remarks by Dr. Thibaut Lery, European Science Foundation Representative

The Friday morning session commenced with a presentation by Dr. Thibaut Lery, representative from the European Science Foundation (ESF). He briefly outlined the organization and activities of ESF, sources of funding, review procedures, operations of individual national components, and goals for the next several years.

Lery noted that ESF is an independent association of 78 Member Organizations in 30 European countries. These organizations are research funding/performing organizations and academies and learned societies. The offices of the ESF are located in Strasbourg and in Brussels. It has a staff of approximately 160 employees and, in 2010, a budget of €57 million.

The overall science investment in Europe is €30 billion, with 85% of this amount coming from national research funders such as national funding agencies and ESF members, 10% coming from EIROFORUM (CERN, the European Space Agency, etc.). Five percent comes from the European Union, and the remaining (less than 1%) coming from international collaborations.

Lery described the ESF Member Organization Forums, which consist of discussion platforms for Member Organisations to develop joint strategy. These are time-limited activities and their typical lifetime is approximately two years. Discussions of some of these forums have been Research Integrity, Research Infrastructures, Science in Society Relationships, Evaluation of Publicly Funded Research, Indicators of Internationalization, Peer Review, Scientific Foresight for Joint Strategy Development, and European Alliance on Research Career Development

Lery then described a proposal that had been submitted to the European Union aimed at developing a stronger cooperation in mathematics in Europe. It was entitled "A Design Study for a Virtual Research Infrastructure in Mathematics." The background for this project was a document entitled "Forward Look on Mathematics and Industry." The recommendations of this document were that policy makers and funding organisations should join their efforts to fund mathematics activities through a European Institute of Mathematics for Innovation. The EU and National funding agencies should create a *European Institute of Mathematics for Innovation* (EIMI). A Small Business Act in Mathematics (SBAM) should be passed to encourage spin-off companies explicitly using mathematics. Furthermore, the EU must identify industrial and applied mathematics as an independent crosscutting priority by the European Commission. In order to overcome geographical and scientific fragmentation, academic institutions and industry must share and disseminate best practises across Europe and disciplines via networks and digital means. Finally, mathematical societies and academic institutions should create common curricula and educational programmes in mathematics at European level taking into account local expertise and specificity.

It was this background that led to the EC Proposal for a "Design Study for a European Infrastructure of Mathematics for Innovation."

A number of other ESF activities were described, including a European eInfrastructures Observatory www.euinventory.edu and www.riportal.eu, He described the Materials Science and Engineering Expert committee (MatSEEC), which was established in October 2009 within the ESF with a 5-year limited time mandate. Its mission is focussed on strategic advice and foresight, with 24 supporting Member Institutions and a Working Group on Computational Techniques and Methods.

Lery then went on to describe the "Future Emerging Technologies Flagships." These are part of the Information Society Directorate of the European Commission. The Flagship Initiatives are building on areas of established European excellence in Information and Communication Technology (ICT) and emerging technologies. They are envisioned to run for 10 years, on a budget in the range of 100 M€ per year and per initiative. Six pilots were chosen in January 2011 and out of these at least 2 Flagships will be selected and launched in 2013. Also, the ESF is involved in "Graphene-Driven Revolutions in ICT and Beyond", "Robotics" and "Future ICT".

Lery concluded his presentation by describing a concept being developed is the "EU-US ICON Project." It is a EU/FP7 project with the aim of supporting policy dialogues and strengthening cooperation in Information and Communication Technology (ICT) between Europe and the United States of America. It will identify policy and research priorities to support the development of policy dialogues through continuous support and knowledge sharing. It is hoped that there will be an activity leading to recommendations and a joint ICT roadmap. It will also organize cooperative events both in Europe and the US.

MPS Perspective on Planning Needs for FY 2012 and Beyond

Seidel discussed implementation plans for the current fiscal year and for FY2012. He said that what he hoped to achieve here would allow MPS to develop what is need for programs and budget implementation for FY 2012 and for planning for the budget request for FY 2013. With respect to the MPSAC, decisions would have to made on future activities such as what working groups would continue, whether new groups should be created and whether some of the active groups should remain active. There was also the question of development of an MPS Vision document.

MPS and a Family-Responsible Culture

Dr. Janice Hicks, Deputy Division Director of DMR to discuss MPS activities related to the topic "MPS and a Family-Responsible Culture." Hicks began by noting that the activities of the internal MPS working group created to address this issue were dealing with the NSF-wide goals of catalyzing human capital development, developing a world-class STEM workforce, and recruiting and retaining women in STEM

With respect to the last of these goals, that of recruiting and retaining women in the STEM workforce, issues that arose involved childbirth/childcare, eldercare, work/life balance, and dual career couples.

Hicks discussed issues that affected the community external to NSF. The MPS working groups recommended that NSF should allow full-cost extensions to new parents or principal investigators facing family crisis, and modify the Grant Proposal Guide (GPG) to clarify that No Cost Extensions (NCEs) are available for a range of situations including parental leave. NSF should encourage awarding organizations to include parental leave and/or clock extension in post-doc criteria and review OMB circulars relating to inclusion of dependent care costs in NSF awards in order to build a case for allowability to cover dependent costs.

NSF should fund mid-career sabbatical programs to allow re-entry of scientists who are not currently principal investigators and it could be made program specific. One could also consider extending the duration of a typical individual investigator award and consider limiting the number of independent investigator awards per principal investigator to a single award in order to make the principal investigator workload more family friendly. NSF should also make better use of information technology in order to encourage the remote participation of individuals in panels.

With respect to issues that affected the internal NSF community, the working group recommended that NSF establish a family friendly culture through communication and training. It should promote and extend existing programs such as telework and flextime; encourage managers to utilize these options to eliminate stigma for other staff and extend child care and child care subsidies. NSF should consider backup nanny or eldercare services, and be an advocate for parental leave in the federal system. It should increase its sensitivity to dual career hiring, and create an NSF website for family-friendly policies. Employees should be surveyed about undocumented over-time and this should be used to make the case for more FTEs. It should also improve IT infrastructure so that off-site rotators and teleworkers can participate more fully.

The next steps in this activity would be a prioritization of the recommendations of the MPS working groups based on effectiveness and feasibility and implement recommendations on a directorate level. There would be coordination with the NSF-wide Family Friendly Policies working group to identify recommendations that can be implemented agency-wide

In the comments that followed this presentation, Orozco noted that women went to graduate schools that had family friendly policies. Takeuchi noted that at a conference at the University of Buffalo, the question of starting families is a major topic.. Other comments concerned Title 9, that universities had

been audited in this area, but that attention to this seemed to have disappeared, and this should be looked into.

FY 2012 Planning and Implementation

With respect to the planning that led to the FY 2012 budget request for MPS Seidel commented that the major driver for MPS had been the fundamental science for which MPS was responsible for supporting. With respect to multidisciplinary activities within the FY 2012 Seidel first commented on SEES and CIF 21. He noted that MPS was involved in both activities, and multiyear roadmaps were under development. There would be research networks associated with SEES and CIF 21 activities, and workshops were under consideration that could lead to international cooperation. Additional multidisciplinary activities included broadening participation, BioMaPS, SEBML, EARS, and matter-by-design. Specific ideas on implementation were welcome and needed, particularly with respect to responding to the recommendations made within the white papers

FY 2013 Budget Request Preparation

In preparing for the FY 2013 budget request, the MPSAC meeting allowed members of the AC to meet with their respective Division to discuss and determine divisional priorities as well as cross-cutting initiatives. Internally, there would be meetings with the MPS Divisions in April, and this would be followed by a retreat in May. There would also be a retreat by the MPS Assistant Directors in May, as well as discussions with the Office of Science and Technology Planning in May and June. An internal budget request for NSF would be prepared for submission to the Office of Management and Budget in early September.

Possible MPSAC Activities

Seidel commented that he wanted MPS to develop a Vision document, and he has asked Aizenman to take the lead in this area. He noted that in the development of such a document, help could be called in from the outside if there was a need to polish the document. He felt that such a document would be useful for laying out MPS strategic directions and priorities.

He felt it would be useful to have the MPSAC working groups interact with the MPS programs in FY 2012 implementation and that they could comment on other reports, such as the Advisory Committee for Cyberinfrastructure reports. Longer term issues to be considered included the development of an interdisciplinary working group, possibly other working groups, and the organization of joint activities with advisory committees in other directorates, including joint workshops. With respect to formation of an interdisciplinary working group, members who volunteered to serve on the working group were Halas (Chair), de Pablo, Glotzer, Neal, Meza, Reichmannis and West.

Discussion of Status of MPSAC White Papers

The current status of the white paper developed by the MPS working groups in concert with NSF staff was discussed:

Basic sciences – Cornell noted that the previous version of the document had been edited in order to make it less MPS-centric. There was some discussion about the definition of the “basic research” with basic meaning that the research advances the frontier. Pantula commented that he felt the document did not have the sense of urgency that the other white papers had.

Broadening participation – Neal recognized activities that have started since the white paper came out, but stated that the AC working group wants to see progress on reframing the broadening participation issue around innovation. Reframing is systemic, not just descriptive of the symptoms. MPS should find out what is happening with the use of Title IX with respect to science and engineering. Seidel noted that an NSF initiative “NSF as the innovation engine” is in the works and

that broadening participation is one of the three main elements. Others commented that one should look at what is taking place in Title 9 enforcement. Perhaps MPS should take the lead in this area.

Atmospheric processes/climate – Finlayson-Pitts stressed that atmospheric models must be reliable. Experiments and theory and a systems approach are needed. NSF has the expertise under one roof but the collaboration between Directorates needs to be systemic, not just based on personal relationships of staff. Roberts asked that the other divisions contribute to this white paper – not just CHE and DMS. This was an area that had a number of cross-cutting themes.

Computational science – Glotzer emphasized that this area needs to be a full partner with experiment, observation and theory. While this involves more than MPS, it is not an Office of Cyberinfrastructure (OCI) function. An implementation working group should be formed, including OCI Advisory Committee representatives. Meza felt that the paper could include more about algorithms.

Data-enabled Science – Berger felt this area is like computational science – it is across NSF and is inherently interdisciplinary. It is likely that teams will solve this problem – including disciplinary experts, math, computer scientists, etc. Norman felt that this had to be implemented now. OCI will be involved. He noted the “digital divide” in MPS, with some divisions leading on Data Enabled Science (DES) and some MPS divisions haven’t thought much about it. Cross fertilization could benefit all.

Energy – Takeuchi noted that this activity is now joint with the Engineering Directorate (ENG) and the focus is on clean, sustainable energy. There is breadth across NSF and NSF is unique for promoting systems-level thinking in this area. Roberts stated that he would like to see Energy and Climate papers merged. However others felt the timing is not right. Crabtree thought that the integration with the Sociology, Behavioral, and Economics Directorate (SBE) makes this effort distinct from Department of Energy (DOE) approaches.

BioMAPSE – Matthews noted that the ENG was now part of this activity. The initiative bridges everything from atoms to the body. Some of the issues include the difficulty of interdisciplinary review panels. The structure at NSF provides a challenge – how can this initiative be organized?

Matter by Design – de Pablo noted that this area is getting support in the FY 2012 budget request, and also at other agencies. Everyone agrees it should have a computational and experimental focus. Because it is broad, it needs to identify initial topics, and the group is planning some workshops to define these. An implementation group is needed.

SEBML – Orozco notes it is already an initiative in FY 11 and FY 12, and has been enlarged somewhat by a recent addition of advanced manufacturing. The report from a recent workshop by MPS and ENG is available and more follow up is needed.

The discussion then turned to whether the MPSAC white papers should be released to the public. Some members were concerned that their white papers had been written for a different purpose – not particularly with a 10-year horizon in mind, and not particularly for the public. Others commented that the white papers, if made public, would be a powerful statement from the MPSAC. Seidel said that he would like to make the white papers public on the website and send a Dear Colleague Letter to explain the role of these papers. Matthews supported the Dear Colleague concept, as did Norman.

Concepts for an MPS Vision Document

Aizenman handed out a strawman vision statement culled from the white papers. Takeuchi thought that the vision should be a short statement and many other agreed. George thought that this should consist of something like four bullet point, and DeSimone echoed this feeling. It was also important to know the audience for this document. West felt that there should be a vision to integrate the nine papers. Roberts was concerned that one was missing the education aspect. Orozco wondered how the MPS vision fit within the NSF strategic plan. Finlayson-Pitts felt that the nine papers encourage work across NSF but one has to remember that this is MPS. In response Seidel commented that MPS activities are central to many of these aspects. Hawley felt that the vision document could be a

shortened document, with the nine themes alluded to but not fleshed out, and that the reader could be referred to the full white papers for the details.

Lunch with NSF Director Dr. Subra Suresh and Dr. Cora Marrett

The meeting with the Drs. Suresh and Marrett began with a thank-you statement to the MPSAC by Dr. Suresh

He noted that the prospect of a government shutdown had kept everyone very busy. The FY 2012 budget request had been submitted and the FY 2013 budget request will be his first full-cycle experience with budget activity. With respect to the FY 2013 request he noted that the commitment of NSF to fund basic research is critical. He emphasized that involvement in multidisciplinary research did not mean abandoning disciplinary research. He noted that NSF must justify its activities to a broad audience and, within the science and engineering community, NSF must balance the support of large facilities versus individual research activity. Also, individual research activity plays an important role in workforce development. These were fundamental operating principles as NSF moves forward in 2011 and 2012.

The session continued with the presentation of brief descriptions of the white papers prepared by the nine MPSAC working groups. Cornell presented a short summary of the "At the Foundation of the Foundation: Basic Research at the NSF" basic research white paper and Dr. Suresh responded that in written congressional testimony he had used examples of NSF-funded basic research that had migrated to the market place e.g. GPS, nanotechnology. The latter has produced 175 start-up companies. NSF started the Small Business Innovative Research (SBIR) program that was now part of a number of other agencies. Dr. Marrett commented that we should use the terminology "scientific research" instead of "basic research" in public settings.

Neal described the "New Directions for Broadening Participation in MPS" white paper. Suresh commented that during the past few months NSF had been looking at broadening participation programs at NSF. He offered two points on framing broader participation in the context of future scientific workforce. First, there is need to address the role of women in the future scientific workforce. Second, by 2040 the U.S. will be a country of with minorities becoming an increasing fraction of the population and one cannot wait until 2030 to act. Marrett commented that she would like to see MPS is taking a leadership role in this activity and Suresh added that if MPS, as the largest directorate, takes the lead, others will follow.

Barbara J. Finlayson-Pitts described the "Climate, Atmospheric Processes and Air Quality: Providing Fundamental Insights and Tools for the Next Advances through the Mathematical and Physical Sciences" white paper and this was followed by Glotzer summarizing the "Computational Science" white paper. Berger described the findings of the "Data-Enabled Science in the Mathematical and Physical Sciences" white paper, and Marrett commented that she liked the involvement of all of the five MPS divisions in this activity. She added that this was an area that crosses all of NSF and was glad to see MPS taking the lead in this area.

Takeuchi described the "Clean Sustainable Energy" white paper. Suresh commented that the SEES 2012 budget request includes "clean energy." The connection between energy research and social and behavioral sciences is important. Developing effective communication skills in this matter is also important. NSF has set up an agency-wide taskforce to help NSF staff and grantees with communication on such programs.

Matthews described the "Challenges at the Interface: BioMaPS, Integrative Research among the Biological, Mathematical and Physical Sciences" white paper and de Pablo summarized the "Matter by Design" white paper. Orozco summarized the "Science and Engineering Beyond Moore's Law" white paper.

The meeting with Suresh and Marrett concluded with Suresh once again thanking the MPSAC for its work.

Other Business

During the concluding discussion points raised included the need to see that recommendations made within the white papers were addressed and to the extent possible, implemented. It was important that these white papers showed the strong interdisciplinarity of many of MPS' activities, and perhaps it was time to rethink of other structures within MPS. It was felt that at the next MPSAC meeting one of the topics that could be the subject of discussion was possible reorganization of MPS. The comment was made that the Division of Chemistry had done a bibliographic analysis of interconnections in its field, and that this might be extended for all of MPS. The interdisciplinary working group would begin discussions via teleconferences during the summer.

Adjournment

The meeting was adjourned at 2:00 PM.

APPENDIX I

ATTENDEES

MPSAC Members Present at NSF

Taft Armandroff, W. M. Keck Observatory
James Berger, Duke University
Daniela Bortoletto, Purdue University
Paul Butler, Carnegie Institution of Washington
Kevin Corlett, University of Chicago
Eric Cornell, JILA and the University of Colorado
George Crabtree, Argonne Laboratories
Juan de Pablo, University of Wisconsin-Madison
Joseph DeSimone, University of North Carolina, Chapel Hill
Barbara J. Finlayson-Pitts, University of California, Irvine
Irene Fonseca, Carnegie Mellon University
Sharon C. Glotzer, University of Michigan
Naomi Halas, Rice University
Suzanne Hawley, University of Washington
Jerzy Leszczynski, Jackson State University
Dennis L. Matthews, University of California, Davis
Juan Meza, Lawrence Berkeley National Laboratory
Sharon L. Neal, University of Delaware
Michael Norman, University of California, San Diego
Luis Orozco, University of Maryland
Elsa Reichmanis, Georgia Institute of Technology
Fred S. Roberts, Rutgers University
Esther Takeuchi, SUNY, Buffalo
Geoffrey West, Santa Fe Institute

MPSAC Members Absent

Ramesh Narayan, Harvard-Smithsonian Center for Astrophysics and Harvard University
Eugenia Paulus, North Hennepin Community College
John Peoples, Jr. Fermilab

MPS Staff

Morris Aizenman, Office of the Assistant Director, MPS
Joseph Akkara, Division of Materials Research
James Alexander, Division of Mathematical Sciences
Allan Ardell, Division of Materials Research
Denise Caldwell, Deputy Division Director, Division of Physics
Tom Carruthers, Division of Physics
Kevin Clancy, Division of Mathematical Sciences
Joseph Dehmer, Division of Physics
Janice Hicks, Division of Materials Research
Lee Jameson, Division of Mathematical Sciences
Robert Joyce, Division of Grants and Agreements
Zakya Kafafi, Division of Chemistry
Dana Lehr, Division of Astronomical Sciences
Lynnette Madsen, Division of Materials Research
Denise Martin, Division of Grants and Agreements
Vernon Pankonin, Division of Astronomical Sciences
Sastry Pantula, Division of Mathematical Sciences
Elizabeth Pentecost, Division of Astronomical Sciences
Matthew Platz, Division of Chemistry
Ian Robertson, Division of Materials Research
Yongwu Rong, Division of Mathematical Sciences

Jean Rene Roy, Large Facilities Office
Thomas Russell, Division of Mathematical Sciences
Edward Seidel, Assistant Director, MPS
James Ulvestad, Division of Astronomical Sciences
G. Wayne van Citters, Jr., Office of Assistant Director, MPS
Henry Warchall, Division of Mathematical Sciences

Visitors

Saewoo Nam, Office of Science and Technology Policy
Michael Ledford, Lewos-Burke Associates
Miriam Quintal, Lewis-Burke Associates

APPENDIX II

**BREAKOUT SESSION ROOMS
MPS Advisory Committee Meeting
Thursday Afternoon, April 7, 2011**

		DIVISIONAL ASSIGNMENTS FOR MPSAC MEMBERS					
		AST	PHY	CHE	DMR	DMS	
		Room	Room	Room	Room	Room	
		320	330	370	380	1060*	
Term Ends 09/30/11							
	BERGER					X	
	BORTOLETTO		R				
	CORNELL		X				
	FINLAYSON-PITTS			X			
	FONSECA					R	
	HAWLEY	R					
A	NARAYAN	A					
	NEAL			R			
A	PEOPLES	A					
	MATTHEWS		X				
	REICHMANIS				R		
	WEST		X				
Term Ends 09/30/12							
	ARMANDROFF	X					
	CORLETTE					X	
	DE PABLO				X		
	DESIMONE			X			
	GLOTZER				X		
	LESZCZYNSKI			X			
	OROZCO		X				
	ROBERTS					X	
Term Ends 09/30/12							
	BUTLER	X					
	CRABTREE				X		
	HALAS				X		
	MEZA					X	
	NORMAN	X					
A	PAULUS			A			
	TAKEUCHI			X			
A	Absent						
R	Breakout CHAIR, MPSAC member who will summarize Divisional meetings activities to MPSAC						

APPENDIX III

MPSAC Working Group Membership FY 2011

Computation - DES	Climate	Energy	SEBML	Life Sciences	Broadening Participation
<p>Glotzer - Berger de Pablo Fonseca Hawley Leszczynski Meza Norman Lee Jameson (DMS) 703-292-4833 lameson@nsf.gov</p>	<p>Finlayson-Pitts Armandroff Berger Butler Norman Reichmanis Roberts Zeev Rosenzweig (CHE) 703-292-7719 zrosenzw@nsf.gov</p>	<p>Takeuchi Bartoletto Crabtree Fonseca Peoples West Linda Sapochak (DMR) 703-292-4945 lsapocha@nsf.gov</p>	<p>Orozco Cornell Corlette DeSimone Charles Bouldin (DMR) 703-292-4920 cbouldin@nsf.gov</p>	<p>Matthews Berger Butler de Pablo Narayan Mary Ann Horn (DMS) 703-292-4879 mhorn@nsf.gov</p>	<p>Neal de Pablo DeSimone Hawley Leszczynski Matthews Paulus Charles Pibel (PHY) 703-292-4971 cpibel@nsf.gov</p>

MPSAC Working Group Membership FY 2011

Matter by Design	Basic Research	Facilities	Inter-Disciplinary
<p>De Pablo Glotzer Halas Leszczynski Reichmanis Andy Lovinger (DMR) 703-292-4933 alovinge@nsf.gov</p>	<p>Cornell Bartoletto Corlette DeSimone Fonseca Hawley Reichmanis Morris Aizenman (OAD) 703-292-8807 maizenman@nsf.gov</p>	<p>Armandroff DeSimone Fonseca Matthews Orozco Wayne van Citters (OAD) 703-292- gvancitt@nsf.gov</p>	<p>Halas Glotzer Neal Orozcoc Reichmanis Takeuchi West Morris L. Aizenman (OAD) 703-292-8807 maizenman@nsf.gov</p>

APPENDIX IV

July 18, 2011

Dr. H. Edward Seidel,
Acting Assistant Director
Directorate for Mathematical and Physical Sciences
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Dear Ed:

I have reviewed the final version of the minutes of the Directorate for Mathematical and Physical Sciences Advisory Committee meeting that was held April 7-8, 2011 (attached), and am pleased to certify the accuracy of these minutes.

Sincerely,

Signed

Jim Berger
Chair, Mathematical and Physical Sciences Advisory Committee