

Performance Audit of Incurred Costs – University of Maryland College Park

REPORT PREPARED BY WITHUMSMITH+BROWN, P.C.

NATIONAL SCIENCE FOUNDATION
OFFICE OF INSPECTOR GENERAL

May 2, 2019
OIG 19-1-010





AT A GLANCE

Performance Audit of Incurred Costs – University of Maryland College Park
Report No. OIG 19-1-010
May 2, 2019

AUDIT OBJECTIVE

The National Science Foundation Office of Inspector General engaged WithumSmith+Brown, P.C. (WSB) to conduct a performance audit of incurred costs at the University of Maryland College Park (Maryland) for the period January 1, 2013, to December 31, 2015. The auditors tested more than \$3.1 million of the approximately \$170 million of costs claimed to NSF. The objective of the audit was to determine if costs claimed by Maryland on NSF awards were allowable, allocable, reasonable, and in compliance with NSF award terms and conditions and Federal financial assistance requirements.

AUDIT RESULTS

The report highlights concerns about Maryland's compliance with certain Federal, NSF, and/or Maryland regulations and policies when allocating expenses to NSF awards. The auditors questioned \$357,108 of costs claimed by Maryland during the audit period. Specifically, the auditors found \$101,937 in unreasonable and unallocable payroll transfers, \$79,956 in unreasonable purchases of equipment, \$45,628 in inadequately documented charges, \$37,812 in purchases near or after the award expiration, \$31,697 in unallocable costs, \$24,559 in unreasonable travel, \$13,905 in unreasonable cost transfers, \$12,659 in unallowable indirect costs, and \$8,955 in unallowable public relation costs. WSB is responsible for the attached report and the conclusions expressed in this report. NSF OIG does not express any opinion on the conclusions presented in WSB's audit report.

RECOMMENDATIONS

The auditors included nine findings in the report with associated recommendations for NSF to resolve the questioned costs and to ensure Maryland strengthens administrative and management controls.

AUDITEE RESPONSE

Maryland expressed varying levels of agreement and disagreement with the findings throughout the report. Maryland's response is attached in its entirety to the report as Appendix A.

FOR FURTHER INFORMATION, CONTACT US AT OIGPUBLICAFFAIRS@NSF.GOV.



National Science Foundation • Office of Inspector General
2415 Eisenhower Avenue, Alexandria, Virginia 22314

MEMORANDUM

DATE: May 2, 2019

TO: Dale Bell
Director
Division of Institution and Award Support

Jamie French
Director
Division of Grants and Agreements

FROM: Mark Bell [REDACTED]
Assistant Inspector General
Office of Audits

SUBJECT: Audit Report No. 19-1-010, University of Maryland College Park

This memo transmits the WithumSmith+Brown, P.C. (WSB) report for the audit of costs charged by the University of Maryland College Park (Maryland) to its sponsored agreements with the National Science Foundation (NSF) during the period January 1, 2013, to December 31, 2015. The audit encompassed more than \$3.1 million of the approximately \$170 million claimed to NSF during the period. The objective of the audit was to determine if costs claimed by Maryland on NSF awards were allowable, allocable, reasonable, and in compliance with NSF award terms and conditions and Federal financial assistance requirements.

Please coordinate with our office during the 6-month resolution period, as specified by Office of Management and Budget Circular A-50, to develop a mutually agreeable resolution of the audit findings. The findings should not be closed until NSF determines that all recommendations have been adequately addressed and the proposed corrective actions have been satisfactorily implemented.

OIG Oversight of the Audit

WSB is responsible for the attached auditors' report and the conclusions expressed in this report. We do not express any opinion on the conclusions presented in WSB's audit report. To fulfill our responsibilities, we:

- reviewed WSB's approach and planning of the audit;

- evaluated the qualifications and independence of the auditors;
- monitored the progress of the audit at key points;
- coordinated periodic meetings with WSB, as necessary, to discuss audit progress, findings, and recommendations;
- reviewed the audit report prepared by WSB; and
- coordinated issuance of the audit report.

We thank your staff for the assistance that was extended to the auditors during this audit. If you have any questions regarding this report, please contact Billy McCain at 703.292.7100 or OIGpublicaffairs@nsf.gov.

Attachment

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Performance Audit of Incurred Costs

National Science Foundation Office of Inspector General

April 30, 2019

OIG 19-1-010

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Abbreviations

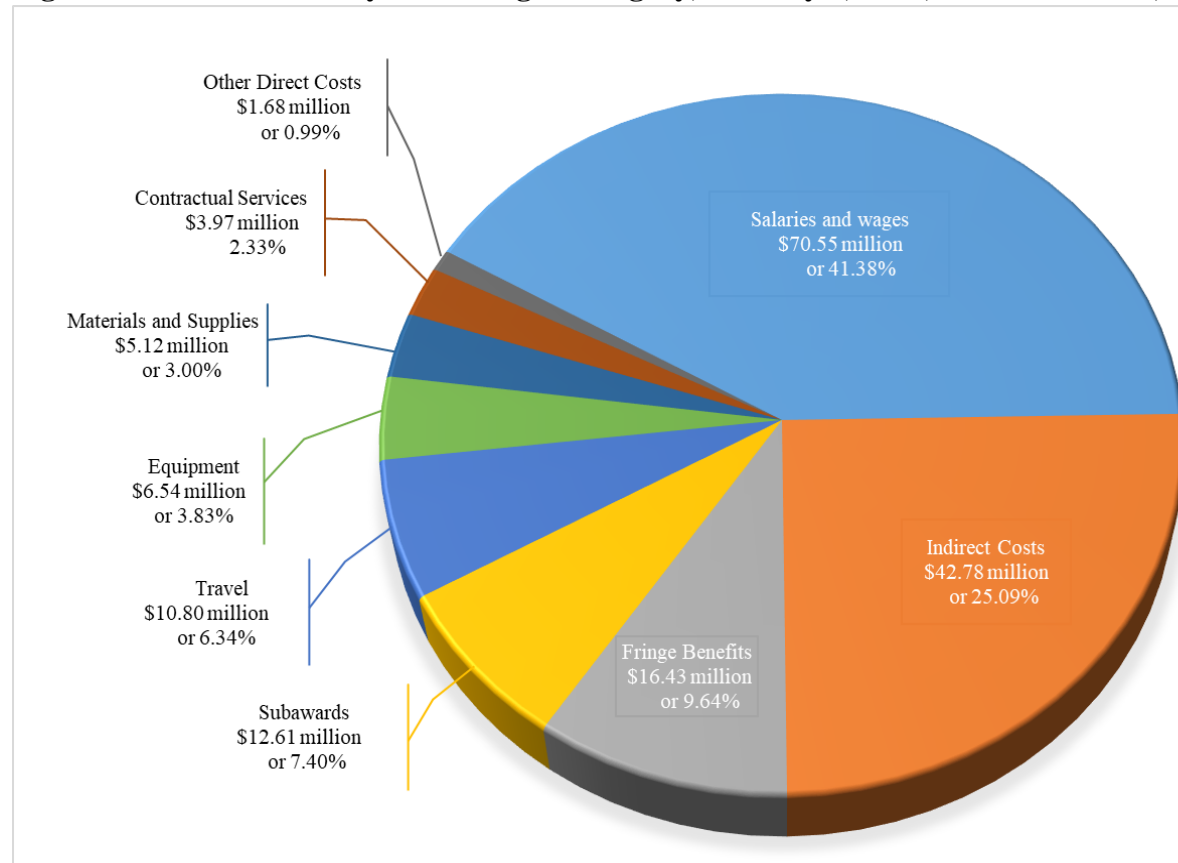
AAG	Award Administration Guide
CFR	Code of Federal Regulations
F&A	Facilities and Administration
ISR	Institute for Systems Research
NCE	No-cost Extension
PI	Principal Investigator
SPAC	Sponsored Program Accounting and Compliance
UMD	University of Maryland
UMIACS	University of Maryland Institute for Advanced Computer Studies

Background

The National Science Foundation (NSF) is an independent Federal agency created “to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense.”¹ NSF is also committed to ensuring an adequate supply of the Nation’s scientists, engineers, and science educators. NSF funds research and education in science and engineering by awarding grants and contracts to educational and research institutions in all parts of the United States.

NSF awardees must follow Federal and NSF award regulations and guidance in administering NSF awards. The University of Maryland, College Park (UMD), a public research university, received approximately \$648 million in Federal grants and contracts for Fiscal Year 2016. As illustrated in Figure 1, from January 1, 2013 through December 31, 2015, UMD claimed approximately \$170 million, in more than 405,000 transactions, across 842 individual NSF awards. An analysis of these costs claimed by budget category, based on the accounting data provided by UMD, is portrayed in Figure 1.

Figure 1. Costs Claimed by NSF Budget Category, January 1, 2013, to December 31, 2015



Source: Auditor summary of accounting data provided by UMD

¹ Pub. L. No. 81-507

Results of Audit

WithumSmith+Brown, under contract with NSF OIG, audited the costs claimed by UMD on NSF awards for the period beginning January 1, 2013, and ending December 31, 2015. UMD did not always comply with all Federal and NSF regulations and policies when allocating expenses to NSF awards. In our testing of 300 judgmentally selected transactions, totaling more than \$3.1 million, we identified 39 transactions with a total \$357,108 of questioned costs charged to 34 NSF awards. Nine areas where improved oversight is needed to ensure costs claimed are reasonable and necessary in accordance with Federal and NSF award requirements include: 1) \$101,937 in unreasonable and unallocable payroll transfers; 2) \$79,956 in unreasonable purchases of equipment; 3) \$45,628 in inadequately documented charges; 4) \$37,812 for purchases near or after the award expiration; 5) \$31,697 in unallocable costs; 6) \$24,559 in unreasonable travel; 7) \$13,905 in unreasonable cost transfers; 8) \$12,659 in unallowable indirect costs; and 9) \$8,955 in unallowable public relation costs. See Appendix C for a schedule of questioned costs by finding.

Finding 1: Unreasonable and Unallocable Payroll Transfers

UMD unreasonably charged \$101,937 in salary expense to four NSF awards. According to 2 CFR 220 Appendix A, Section C.4.b, costs cannot be shifted to other grants to meet deficiencies caused by overruns or for other reasons of convenience.

Unreasonable and Unallocable Payroll Cost Transfers Due to Revised Effort Reports

We questioned \$30,804 for 2 months of salary and wages charged to one NSF award. The original charge transferred onto the NSF award totaled \$61,608 (see Table 1) and covered 8 pay periods representing time from August 26, 2012, through December 15, 2012. We questioned four pay periods, totaling \$30,804, of this transfer.

Table 1. Payroll Transfers Near the Award Expiration

	Pay Period End Date	Salary Charged	Fringe Charged	F&A *	Total Charged	Amount Questioned
1.	September 8, 2012	\$ 4,004	\$ 1,130	\$ 2,567	\$ 7,701	\$ --
2.	September 22, 2012	4,004	1,130	2,567	7,701	--
3.	October 6, 2012	4,004	1,130	2,567	7,701	--
4.	October 20, 2012	4,004	1,130	2,567	7,701	--
5.	November 3, 2012	4,004	1,130	2,567	7,701	7,701
6.	November 17, 2012	4,004	1,130	2,567	7,701	7,701
7.	December 1, 2012	4,004	1,130	2,567	7,701	7,701
8.	December 15, 2012	4,004	1,130	2,567	7,701	7,701
Total		\$ 32,032	\$ 9,040	\$ 20,536	\$ 61,608	\$30,804

Source: Auditor analysis of questioned transactions

*Facilities and Administration

We determined that payroll charges to the award were not reasonable or allocable for the following reasons:

- The original effort report submitted on March 12, 2013, indicated that the Principal Investigator (PI) did not have any time allocated to award. The effort report was revised more than a year later on June 3, 2014, to indicate that the PI had worked on the award for the period in question. However, we noted that the entry to move salary onto the award, dated May 19, 2014, was done prior to the effort report being revised. Furthermore, the effort report revision was not approved until September 16, 2014. This was 105 days after the revised effort report was submitted and 78 days after the expiration of the award.
- The PI submitted a no-cost extension (NCE) dated August 15, 2013, to extend the award period to June 30, 2014. UMD stated on the NCE, "...the additional time requested will allow the graduate students involved to complete the project overall and to complete both the research and the reporting of the results via journal and conference publications [sic]." The NCE does not indicate that funds would be used to support the PI's salary.
- The project reports submitted to NSF by UMD indicated that the PI was working on the award with only 1 month of effort. The project report for the period beginning October 1, 2012, and ending September 30, 2013, was submitted on September 16, 2014, the same date the effort report revision was approved.

We determined that four pay periods, representing the 2 months covered by project reports, were reasonably charged to the award. The remaining four pay periods were determined not to be reasonably charged to the award. Therefore, we question \$30,804 for the salary and wages transferred.

Unreasonable and Unallocable Payroll Cost Transfers After Award Expiration

We also questioned \$28,004 in unreasonable and unallocable salary and wages transferred to one NSF award after the award expiration. All payroll charges moved onto the award were determined to be unreasonable for the following reasons:

- A UMD email dated March 11, 2015, included an exchange that identified the available budget on two NSF awards and a request for action to post expenses to remove deficits.
- A follow-up email dated April 13, 2015, stated that UMD needed to "finalize this in April or NSF will get funds back. You have approximately 47K direct to spend" This email was dated 72 days after the award expiration date.
- In follow-up emails dated April 16, 2015, an individual authorized spending of \$54,683 of direct costs by the end of that week on as much of the PI's salary "as allowed." These emails were dated 75 days after award expiration.
- The transfer of salaries occurred via journal entry on April 17, 2015, after the award expiration date of January 31, 2015. The revised effort report was not approved until June 15, 2015. The transfer was from non-Federal departmental funds to the NSF award.
- The break-out of effort per pay period provided did not appear reasonable. For example, UMD determined that 35.8 percent of time was spent on the award, which equates to 14.32 hours worked. These unusual amounts and percentages make it appear UMD was trying to achieve a predetermined dollar amount.

- The original award expiration date was January 31, 2014; it was extended to January 31, 2015. The justification for the NCE, requested on December 2, 2013, stated that for “summer 2014, we would like to run the [Research Experience for Undergraduates] site for at least eight students with the remaining funds.” The NCE did not indicate funds were to be used for the PI’s salary.
- The award was a Research Experience for Undergraduates award with the purpose of supporting active research participation by undergraduate students. The approved NSF budget included 1.5 summer months to be spent by the PI on the award. It does not appear reasonable to subsequently add these additional non-summer PI charges to the award.

Payroll Coding Errors

We questioned \$25,999 for a payroll cost transfer that was incorrectly charged to one NSF award due to improper account coding during the initial processing. The error was discovered by UMD while providing documentation for the audit. According to UMD, the charge was removed from the NSF award on September 19, 2017. NSF’s Resolution and Advanced Monitoring Branch should ensure the charge has been properly removed.

We also questioned \$17,130 for Graduate Assistant salary and wages. At the time this error occurred, the PI was not receiving financial reports on a regular basis. UMD has since begun generating frequent financial reports. The error was discovered by UMD while providing documentation for the audit. According to UMD, the charge was removed from the NSF award on November 5, 2018. NSF’s Resolution and Advanced Monitoring Branch should ensure the charge has been properly removed.

UMD personnel did not adequately review the above questioned payroll transfers, which resulted in unreasonable costs. Enhanced oversight procedures and controls should be adopted to review payroll transfers. Having improved oversight processes ensures costs are reasonable and allowable, thus reducing the risk that funds may not be used in accordance with Federal and NSF requirements.

Recommendations

We recommend that NSF’s Director of the Division of Institution and Award Support:

1. Resolve the \$101,937 in questioned costs, and direct UMD to repay or otherwise remove the sustained questioned costs from its NSF awards.
2. Direct UMD to strengthen administrative and management controls and processes over payroll expenditures.

Summary of Awardee Response

UMD disagreed with the auditors’ conclusions regarding the unreasonable payroll cost transfer due to revised effort reports (totaling \$30,804 of questioned costs) and the unreasonable payroll cost transfers after the award expiration (totaling \$28,004 of questioned costs). UMD agreed with

our conclusions for the payroll coding errors (\$25,999 and \$17,130 of questioned costs) and indicated it refunded the charges during the audit.

Unreasonable Payroll Cost Transfer Due to Revised Effort Reports

UMD disagreed with \$30,804 of questioned costs for this finding. UMD stated that the PI serves a dual appointment between two departments, and delayed communication between these two departments caused the late cost transfer. The original salary of \$30,804 charged to the UMD account, should have been charged to the NSF account, which is consistent with UMD cost transfer procedures. UMD stated that the Sponsored Program Accounting and Compliance (SPAC) department reviewed the transfer and determined it was an allowable and reasonable charge to the NSF award. UMD also stated that the auditors misunderstood the accounting system coding that distinguishes departmental accounts from Federal accounts, and incorrectly concluded that the salary had been overcharged to the NSF award.

Unreasonable Payroll Cost Transfers after Award Expiration

UMD disagreed with the \$28,004 of questioned costs related to this finding. UMD explained time and effort certification occurs twice a year. In addition, salary distributions are initially made based on how an individual is expected to expend effort over an extended period of time. UMD stated that corrections to the predefined distributions, represent legitimate transactions to ensure payroll charges match effort expended. Changes to payroll distribution done at the time of effort certification are not subject to the UMD cost transfer procedure's 90-day cost transfer limitation. UMD further stated that departments are expected to review sponsored accounts monthly and make all changes as soon as information is available. For awards that expire in the middle of an effort reporting period, departments are responsible for ensuring the accuracy of the salary charges before SPAC issues a final expenditure report. The PI in question was named as the project leader for Graduate students, and as such, his effort was allowable to the award. An administrative error caused a delay in posting his salary to the correct award due to his split appointment between two departments, and the lack of communication between the two units.

UMD also stated it will take steps to tighten controls and enhance payroll coding procedures, particularly in cases where split appointments exist.

See Appendix A for the complete UMD response.

Auditors' Additional Comments

UMD's comments relating to the payroll coding errors (\$25,199 and \$17,130 of questioned costs) are responsive to the issue. Once NSF determines that the \$42,329 in questioned costs have been returned, this issue should be closed.

UMD's comments relating to the unreasonable payroll cost transfer due to revised effort reports does not change our view that these costs should be questioned. UMD's comments primarily relate to the reason the transfer was not timely, which was not a primary factor for questioning the costs. For example, UMD did not explain why the cost transfer was done before the effort report was revised (which according to the explanation above, should have been the supporting document for the cost transfer). Additionally, UMD's comment that we mistakenly believed the salary was overcharged is not correct, as our finding is not based on the total amount of salaries charged.

UMD's comments relating to unreasonable cost transfers after award expiration does not change our view that these costs should be questioned. UMD's comments primarily relate to explaining the late posting of the entry, which was not the primary factor for questioning these costs. UMD did not adequately address the other factors cited in our finding.

As a result, our recommendations remain unchanged.

Finding 2: Unreasonable Purchases of Equipment

We found UMD made purchases near the end of award periods for items that did not appear reasonable or allocable to the awards charged. Specifically, we identified five transactions, charged to five awards, totaling \$79,956.

Equipment Purchases

We questioned the reasonableness and allocability of \$72,112 for the purchase of a liquid helium system. The total cost of the system was \$112,111, and 64 percent of the cost was allocated to the NSF award. UMD did not provide support for the allocation methodology. As a result, we were unable to determine the reasonableness of the allocation as required by Federal regulations.² Additionally, although the NSF award budget did not include equipment, UMD spent approximately 18 percent of the award budget on this system within the final 3 percent of the award life. Without support for the allocation methodology, it is not possible to determine if the expense was reasonable and allocable, especially considering the limited period of performance remaining on the award. The system was shipped on November 25, 2014, on an award that expired January 31, 2015. The system was available for 3 percent of the award life (67 out of 2,175 days).

Computer Purchases

We questioned \$2,169 for the purchase of a laptop computer for a PI that was not allowable or allocable to the award charged in accordance with Federal regulations². The laptop was purchased on May 2, 2013 and charged 100 percent to an 18-month award that expired on January 31, 2014. Although the PI indicated the laptop was used as the “main workhorse” for calculations, writing papers, and other functions, we noted the PI did not charge any time to this NSF award after this laptop was purchased, but rather charged time to other projects, including other NSF awards. Therefore, it does not appear this cost was incurred solely to advance the work under the NSF award charged, as required by 2 CFR Part 220.

Additionally, NSF’s policies normally do not allow these types of computer purchases to be charged to NSF awards³. NSF’s *Award & Administration Guide*, Chapter V, B.2.d (January 2011) states: “[e]xpenditures for general purpose equipment are normally unallowable unless the equipment is primarily or exclusively used in the actual conduct of research.” The purchase order for this laptop stated that the justification for the purchase was for a “[s]eparate laptop for travel to [REDACTED]”; however, the award budget did not include any travel and the award proposal stated the research would be conducted in the PI’s office. Since there was no evidence the laptop was primarily or exclusively used in the actual conduct of research on this award, and no evidence the costs were incurred solely to advance the work under this award, we questioned these costs.

² 2 CFR Part 220, Appendix A, Section C.4 states that “a cost is allocable to a sponsored agreement if it is incurred solely to advance the work under the sponsored agreement; it benefits both the sponsored agreement and other work of the institution, in proportions that can be approximated through use of reasonable methods....”

³ NSF’s *Award & Administration Guide*, Chapter V, B.2.d (January 2011) states: “[e]xpenditures for general purpose equipment are normally unallowable unless the equipment is primarily or exclusively used in the actual conduct of research.”

We also questioned \$5,675 charged to three NSF awards for general-purpose computers purchased near the award expiration. These purchases did not appear to benefit the awards nor appear to be prudent considering the limited time remaining on the awards.

- \$1,986 for the purchase of a laptop computer, wireless mouse, and screen protector film. According to the PI, this laptop was used for writing and reading papers, drawing, and more recently for computations. The laptop was purchased on December 16, 2013, on a 3-year award that expired on June 30, 2014. This laptop was charged entirely to this NSF award; however, no evidence was provided that this laptop was used primarily or exclusively in the actual conduct of research. The laptop was available for 18 percent of the grant life (196 out of 1,095 days).
- \$1,849 for the purchase of a computer. According to the PI, “the system contributed to the research of three different students after the main funding was expended, to allow them to finish their research.” The computer had an estimated delivery date of July 27, 2015, on a 2-year award that expired on September 30, 2015. The computer, charged 100 percent to this award, was available for 9 percent of the grant life (65 out of 730 days).
- \$1,840 for the purchase of a laptop computer. According to the PI, the laptop was used “for corresponding with [REDACTED] PI and other project personnel; review of manuscripts/theses produced by students on the project; and coordination of project expenditures between my department and laboratories at the [REDACTED] [sic].” These activities are administrative and managerial in nature and do not represent the actual conduct of research as required by NSF guidance. The laptop was purchased on July 21, 2015, on a 6-year award that expired on March 31, 2016 and was charged 100 percent to this award. In response to our audit inquiries, UMD stated the computer was also used 50 percent on another NSF award, which further demonstrates this computer should not have been charged 100 percent to this award. The computer was available for 12 percent of the grant life (254 out of 2,175 days).

Recommendations

We recommend that NSF’s Director of the Division of Institution and Award Support:

1. Resolve the \$79,956 in questioned costs, and direct UMD to repay or otherwise remove the sustained questioned costs from its NSF awards.
2. Direct UMD to strengthen its administrative and management controls and processes related to the review of expenditures charged to Federal awards.

Summary of Awardee Response

UMD believes these costs were reasonable due to the project-specific circumstances surrounding the purchases. UMD believes that the equipment purchases are supported, allowable, allocable and reasonable under the original awards, and meet the test of reasonableness for subsequent use on related research.

UMD stated that each finding and related expenditure(s) was reviewed with the PIs, as were their justifications indicating that the purchases were necessary to achieve final award results. Based on

this information, UMD determined the charges were allowable and necessary to achieve project outcomes, therefore meeting the standard for reasonableness.

UMD cited the NSF Award Administration Guide (AAG), stating “NSF funds may not be expended subsequent to the expiration date of the grant except to liquidate valid commitments that were made on or before the expiration date. . . . For example, commitment of project funds is valid when specialized (research) equipment is ordered well in advance of the expiration date but where, due to unusual or unforeseen circumstances, delivery of such equipment is delayed beyond the expiration date.” Also, the Award Administration Guide, Chapter V.B.2.d on General Purpose Equipment states: “ Expenditures for general purpose equipment are normally unallowable unless the equipment is primarily or exclusively used in the actual conduct of research.”

UMD stated that equipment purchased under one award does not preclude its use under other related research projects. In many cases, research projects are renewed and continue research efforts into the future. UMD believes the items of equipment purchased can be used to advance the research of the specific award as well as related research that may continue on other on-going projects at an institution. In addition, these items of equipment delivered post-expiration can be for data collection and completion of the final reports.

UMD also provided a detailed response for each of the five transactions questioned and explained why it believed the purchases were related to the award in question and how the equipment was used on the award.

See Appendix A for the complete UMD response.

Auditors’ Additional Comments

UMD’s comments do not change our position that these purchases are not reasonable or allocable to the awards charged. Although UMD described examples of how the equipment was used on the award, it did not address or demonstrate that the general-purpose computer equipment was primarily or exclusively used in the actual conduct for research. UMD also did not sufficiently address the allocability issue where the equipment benefitted more than one project. As a result, our recommendations remain unchanged.

Finding 3: Inadequate Documentation

We identified four transactions totaling \$45,628 that did not have adequate documentation to support the charges to the NSF awards as required by Federal regulations, as described in Table 2.

Table 2. Description of Other Unsupported Charges Questioned

Item	Description	NSF Award	Direct Cost Questioned	F&A Questioned	Total Questioned
1	Data collection services		\$ 26,000	\$ 12,500	\$ 38,500
2	Conference payment		5,000	--	5,000
3	Equipment		1,292	626	1,918
4	Surcharge on equipment purchase		210	--	210
Total			\$ 32,502	\$ 13,126	\$ 45,628

Source: Auditor analysis of questioned transactions

Federal regulations require that charges to awards be supported by adequate documentation.⁴ However, as described below, UMD did not provide adequate documentation to support these charges. Therefore, we were unable to determine that these costs were allowable, allocable, and properly charged to the appropriate awards.

Item 1

We questioned \$38,500 (\$26,000 direct costs and \$12,500 indirect costs) charged to an award for a consulting firm to perform data collection surveys. The NSF-approved budget indicated that the surveys would be performed by another University through a collaborative proposal. UMD stated that when the PI moved from the collaborating university to a consulting firm, he moved his portion of the grant there, including the data collection. However, UMD did not provide any evidence that NSF was notified or approved the change in the scope of work to divert funds from the University to the consulting firm. As a result, we questioned the costs charged by the consulting firm.

Item 2

We questioned \$5,000 for payment to a professional society for student participation in a conference. UMD could not provide an invoice or any other documentation to support this expenditure.

Item 3

We questioned \$1,918 (\$1,292 direct costs plus \$626 indirect costs) for an equipment purchase for which adequate support was not provided. As a result of the audit, in June 2018, UMD reviewed the transaction and transferred the costs from the NSF award to a departmental account.

⁴ 2 CFR Part 220, Appendix A, Section A.2.e. states that "...the accounting practices of individual colleges and universities must support the accumulation of costs as required by the principles, and must provide for adequate documentation to support costs charged to sponsored agreements."

Item 4

We questioned \$210 for a surcharge on a vendor invoice totaling \$3,671 for an equipment purchase. The surcharge appears to have been added to an internal bill from UMD's Physics Department, rather than a payment to the vendor. UMD did not provide any supporting documentation for how this internal charge was calculated or why it was necessary for this purchase.

Recommendations

We recommend that NSF's Director of the Division of Institution and Award Support:

1. Resolve the \$43,710 in questioned costs, and direct UMD to repay or otherwise remove the sustained questioned costs from its NSF awards.
2. Direct UMD to provide support that it has repaid the \$1,918 of unsupported questioned costs.
3. Direct UMD to:
 - a. implement policies and procedures to ensure that changes to the scope of work regarding subcontractors is properly approved by NSF and
 - b. implement policies and procedures that describe the source documentation that should be maintained to properly support charges to Federal awards.

Summary of Awardee Response

UMD disagreed with our conclusions for Items 1 (\$38,500 of questioned costs) and 2 (\$5,000 of questioned costs), but agreed with our conclusions for Items 3 (\$1,918 of questioned costs) and 4 (\$210 of questioned costs).

For Item 1, UMD stated the research was for a collaboration involving PIs at UMD and the University of [REDACTED], and after the award, there was a budget modification to provide funding to [REDACTED] (a third-party consulting firm) to perform data collection surveys in support of the research. UMD stated the original scope of the project was maintained, therefore NSF approval was not required.

For Item 2, UMD stated the proposal abstract explicitly cites the student's attendance at this conference as a purpose of the award, and that the invoice for the conference fee was provided. UMD agreed that the incorrect object class code was used in recording the costs and that a correction was made. UMD stated that SPAC reviewed and accepted the documentation for the correction.

See Appendix A for the complete UMD response.

Auditors' Additional Comments

For Item 1, UMD's comments do not change our position that the transfer of the effort from the University of [REDACTED] to [REDACTED] should have been communicated to and approved by NSF.

For Item 2, UMD's comments do not change our position that the \$5,000 charge was not adequately supported. The invoice provided was a lump sum payment to the organization in support of the conference activities. It does not provide support for the actual costs of the event or how the funds were used.

As a result, our recommendations relating to Items 1 and 2 remain unchanged.

UMD's responses to Items 3 and 4 were responsive to our findings, and NSF should verify that the \$1,918 and \$210 have been reimbursed or credited.

Finding 4: Purchases Near or After Award Expiration

We found that UMD made purchases near the end of award periods for items that did not appear reasonable or necessary to the awards charged. Specifically, we identified five unreasonable transactions totaling \$37,812, as described in Table 3.

Table 3. Questioned Transactions Near the Award Expiration

Description	Invoice Amount	F&A	Total Questioned	Days Remaining in Award
1. Vacuum chamber	\$ 25,350	\$ --	\$ 25,350	Received after award expiration
2. 3D printer	4,605	512	5,117	(34)
3. Optical mirrors	2,393	1,196	3,589	(22)
4. 3 computer monitors	1,590	795	2,385	52
5. Various supplies	923	448	1,371	0
Total	\$ 34,861	\$ 2,951	\$ 37,812	

Source: Auditor analysis of questioned transactions

We questioned \$37,812 on five separate multi-year awards for various equipment, materials, and supplies purchased and received near or after the awards' expiration. Each item was charged 100 percent to the associated NSF award, when the award received little, if any, benefit. The timing of the purchases and subsequent receipt of the items leads us to conclude that the purchases were not necessary, reasonable, or prudent or should not have been fully allocated to the associated NSF awards.⁵

The questioned items include:

1. Vacuum chamber – \$25,350 for the purchase of a vacuum chamber that UMD stated was received after the NSF award expired; therefore, it could not benefit this award. Additionally, UMD did not provide the date or support for when the equipment was received and only provided the purchase requisition form for the purchase, not the actual invoice.
2. 3D printer – \$5,117 (\$4,605 direct costs plus \$512 indirect costs) for the purchase of a 3D printer on August 7, 2013, that did not ship until February 3, 2014, which was 34 days after the award expired on December 31, 2013. The 3D printer was received after the NSF award expiration; therefore, it could not benefit the NSF award.

⁵ 2 CFR Part 220, Appendix A, C.2. and C.3 states that costs “must be reasonable; they must be allocable to sponsored agreements.... A cost may be considered reasonable if the nature of the goods or services acquired or applied, and the amount involved therefore, reflect the action that a prudent person would have taken under the circumstances prevailing at the time the decision to incur the cost was made. Major considerations involved in the determination of the reasonableness of a cost are: whether or not the cost is of a type generally recognized as necessary for the operation of the institution or the performance of the sponsored agreement....”

3. Optical mirrors – \$3,589 (\$2,393 direct costs plus \$1,196 indirect costs) for the purchase of optical mirrors that were received on July 22, 2014, 22 days after the NSF award expired on June 30, 2014. The mirrors were not used on the NSF award and provided no benefit.
4. Three computer monitors – \$2,385 (\$1,590 direct costs plus \$795 indirect costs) for the purchase of three computer monitors that were received on April 9, 2013, on a 5-year award that expired May 31, 2013. The monitors were available for less than 3 percent of the award period (52 out of 1,825 days). It does not appear these monitors were used primarily or exclusively on this award. NSF's *Award & Administration Guide*, applicable during the grant, states that general-purpose equipment is normally unallowable unless the equipment is exclusively used in the actual conduct of research.⁶
5. Various Supplies – \$1,371 (\$923 direct costs plus \$448 indirect costs) for the purchase of various supplies, including paper, mechanical pencils, name badges, exam gloves, and a two-shelf cart. The supplies were purchased on September 30, 2013, the same day the NSF award expired. UMD stated that the items were purchased for a conference that was held January 17-19, 2014, which was 3.5 months after the expiration of the NSF award. The supplies were used after the NSF award expiration; therefore, the supplies could not benefit the NSF award.

UMD personnel did not adequately review the above questioned equipment, material, and supply expenditures, which resulted in unreasonable costs. Enhanced oversight procedures and controls should be adopted to review expenditures charged near the end of the award period. Having improved oversight processes ensures costs are reasonable and allowable, thus reducing the risk that funds may not be used as required to accomplish the necessary project objectives in accordance with Federal and NSF requirements.

Recommendations

We recommend that NSF's Director of the Division of Institution and Award Support:

1. Resolve the \$37,812 in questioned costs, and direct UMD to repay or otherwise remove the sustained questioned costs from its NSF awards.
2. Direct UMD to strengthen its administrative and management controls and processes over expenditures near the end of an award.

Summary of Awardee Response

UMD disagrees with the findings and the questioned costs. UMD believes these costs were reasonable due to the project-specific circumstances surrounding the purchases. UMD believes that the equipment purchases are all supportable under the existing assistance cost policy for allowability, allocability and/or reasonableness. In addition, UMD believes these costs meet the test of reasonableness for subsequent use on related research. UMD stated it has justification from the PIs indicating the purchases were necessary to achieve and strengthen the final award results.

⁶ NSF Award & Administration Guide, NSF 08-1, Chapter V, B.2.d

Furthermore, UMD explained the NSF Award Administration Guide (AAG) states, “NSF funds may not be expended subsequent to the expiration date of the grant except to liquidate valid commitments that were made on or before the expiration date. . . . For example, commitment of project funds is valid when specialized (research) equipment is ordered well in advance of the expiration date but where, due to unusual or unforeseen circumstances, delivery of such equipment is delayed beyond the expiration date.” Also, the Award Administration Guide, Chapter V.B.2.d on General Purpose Equipment states: “ Expenditures for general purpose equipment are normally unallowable unless the equipment is primarily or exclusively used in the actual conduct of research.”

UMD stated that equipment purchased under one award does not preclude its use under other related research projects. In many cases, research projects are renewed and continue research efforts into the future. The items of equipment purchased can be used to advance the research of the specific award as well as related research that may continue on other on-going projects at an institution. In addition, these items of equipment delivered post-expiration can be for data collection and completion of the final reports.

UMD provided detailed responses on each of the five questioned transactions as follows:

Item 1 – Vacuum chamber

UMD disagreed with this finding and stated the original NSF award was extended while the sponsored research remained ongoing. In parallel, in 2015, the research team began to also use the vacuum chamber for related [REDACTED]-funded experiments in proton acceleration.

Item 2 – 3D printer

UMD disagreed with this finding and stated the original award was extended through December 2013. The order for the 3D printer was placed August 2013 during the performance period, but due to production delays the 3D printer was delivered in February 2014 after the award expired. However, UMD stated that the I-corps program is focused on business launch activities, which continued as expected after the performance period and the printer was used for its intended business development purpose (technology demonstration) consistent with the NSF Program goals.

Item 3 – Optical mirrors

UMD disagreed with this finding and stated these items, a variety of optical mirrors, were used in the fabrication of the [REDACTED] and that they were needed for operation of the equipment. The [REDACTED] components were identified in the approved budget, were ordered prior to the end of the award, and continued to support the research once the award ended.

Item 4 – Computer monitors

UMD disagreed with this finding and stated the original award supported a computer-intensive examination of the [REDACTED]. The project was followed by an intensive study of the [REDACTED]. These purchases allowed the research team to replace failing equipment in order to finish the original grant and to continue the related follow-on research.

Item 5 – Various supplies

UMD disagreed with this finding and stated the purchase provided materials and supplies for sponsored STEM outreach activities, which continued through the no-cost extension period. The supplies were specifically used for the Conference for Undergraduate Women in Physics, a three-day regional conference for undergraduate physics majors held at UMD from January 17-19, 2014. The purchase was used exclusively to support the UMD-MRSEC's commitment to enlarge the pool of students who become our future scientists and to advance participation of groups traditionally underrepresented in physics.

See Appendix A for the complete UMD response.

Auditors' Additional Comments

UMD's comments do not change our view that the specialized equipment received after the award end date (Items 1, 2 and 3), did not benefit the NSF awards charged and should have been allocated to other purposes or projects. For Item 4, our position has not changed; this general-purpose computer equipment received near the end of the performance period should not have been charged to the award. Finally, UMD's comments concerning Item 5 do not change our view that these items were purchased and used for activities subsequent to the award end date; therefore, the supplies did not benefit the award.

As a result, our recommendations remain unchanged.

Finding 5: Unreasonable Allocation

We identified six transactions totaling \$31,697 related to costs charged to NSF awards based on allocations that were not reasonable or were not supported, as required by Federal regulations. These transactions included lab equipment, software, and computer equipment, as described in Table 4. In some cases, the costs were allocated 100 percent to an NSF award, when documentation indicated the costs benefitted other projects in addition to, or instead of, the NSF award. In other cases, costs were partially charged to the NSF award, but documentation was not provided to support the percentage allocated.

Table 4. Description of Other Unreasonable Allocations

Item	Description	NSF Award	% Allocated	Direct Cost Questioned	F&A Questioned	Total Questioned
1	Lab equipment		50%	\$ 7,235	--	\$ 7,235
2	Software		100%	4,178	2,173	6,351
3	Lab equipment		100%	5,083	--	5,083
4	Computer equipment		31.78%	3,334	1,734	5,068
5	Lab equipment		100%	4,940	--	4,940
6	Lab equipment		100%	3,020	--	3,020
Total				\$ 27,790	\$ 3,907	\$ 31,697

Source: Auditor analysis of questioned transactions

Federal regulations require that costs generally be allocated among projects or activities in proportion to the benefits received.⁷ However, as described below, UMD did not properly allocate certain costs based on the benefits received or did not provide evidence supporting the allocation methods used.

Item 1

We questioned \$7,235 for the purchase of a laser table. The total cost of the laser table was \$14,470, and 50 percent of the cost was allocated to NSF award [REDACTED]. UMD stated that the equipment was jointly sponsored (50/50) by the departments of chemistry and biochemistry. UMD did not provide any documentation to support this allocation methodology; therefore, we question the 50 percent charged to this NSF award.

Item 2

We questioned \$6,351 (\$4,178 direct costs plus \$2,173 indirect costs) for the purchase of two software licenses charged entirely to NSF award [REDACTED]. The software was shared by the entire group in the lab and considered part of the general recurring costs, rather than to solely advance the work of this NSF award. The software licenses were valid from July 2, 2013 to September 18, 2014; this NSF award expired on January 31, 2014. The PI provided a list of six other projects that

⁷ 2 CFR Part 220, Appendix A, Section C.4 states that “a cost is allocable to a sponsored agreement if it is incurred solely to advance the work under the sponsored agreement; it benefits both the sponsored agreement and other work of the institution, in proportions that can be approximated through use of reasonable methods....”

used the software, but did not indicate the proportional benefit to each project. Therefore, we determined that allocating 100 percent of the cost of the software to the NSF award was not reasonable.

Item 3

We questioned \$5,083 for the purchase of an equipment accessory. The cost of the accessory was \$6,354 and was charged 100 percent to NSF award [REDACTED]; however, according to the PI, the equipment was used 20 percent on NSF award [REDACTED] and 80 percent on NSF award [REDACTED]. Therefore, we question \$5,083 (80 percent of \$6,354) for the cost of the equipment that should have been allocated to NSF award [REDACTED].

Item 4

We questioned \$5,068 (\$3,334 direct costs plus \$1,734 indirect costs) for the purchase of computer equipment that was allocated 31.78 percent to NSF award [REDACTED]. According to UMD, the allocation was based on funds available in the NSF award for software, which turned out not to be needed. This allocation was based on funding availability and the budget, rather than on the proportional benefit received or other documented methodology; therefore, we questioned the amount charged to the NSF award.

Item 5

We questioned \$4,940 for equipment that was inappropriately charged to NSF award [REDACTED] rather than award [REDACTED]. The total cost of the equipment was \$24,698 and was charged 100 percent to award [REDACTED]. UMD stated that at the time this equipment was purchased, it was intended solely to be used for award [REDACTED] and was not anticipated to be used on any other project. However, according to the PI, the equipment was used 20 percent on NSF award [REDACTED]. Therefore, we question \$4,940 (20 percent of \$24,698) for the cost of the equipment that should have been allocated to NSF award [REDACTED].

Item 6

We questioned \$3,020 for the purchase of lab equipment charged to NSF award [REDACTED]. The total cost of the equipment was \$15,099, and it was charged 100 percent to this NSF award. According to UMD, the equipment was used 80 percent on this NSF award and 20 percent by other projects. Therefore, we question \$3,020 (20 percent of \$15,099) for the cost of the equipment that did not benefit this NSF award.

Recommendations

We recommend that NSF's Director of the Division of Institution and Award Support:

1. Resolve the \$31,697 in questioned costs, and direct UMD to repay or otherwise remove the sustained questioned costs from its NSF awards.
2. Direct UMD to strengthen administrative and management controls over allocation of costs benefitting multiple awards or projects.

Summary of Awardee Response

UMD disagreed with our conclusions for all six items totaling \$31,697 in questioned costs. In its response, UMD provided an explanation of how the equipment was used on the projects.

See Appendix A for the complete UMD response.

Auditors' Additional Comments

Although UMD's comments describe how the equipment was used in support of the projects, it did not address the specific allocation issues we raised or provide support for any of the allocations; therefore, our recommendations remain unchanged.

Finding 6: Unreasonable Travel

We questioned \$24,559 in travel costs that did not appear reasonable and necessary for the awards charged or were not in compliance with NSF requirements.

Travel Was Not Reasonable and Necessary

We questioned three PI travel expenses for trips that did not appear to be prudent or reasonable for the administration of the NSF award, as required by Federal regulations.⁸

PI Travel to [REDACTED]

We questioned \$8,994 (\$5,996 direct costs plus \$2,998 indirect costs) for travel expenses for the PI for a trip to [REDACTED], from [REDACTED], 2014. The purpose of the trip was to attend a conference from [REDACTED], 2014. However, the PI was unable to attend the conference due to a medical issue. The travel expense was not reasonable as it did not benefit the award.

PI Travel to University of [REDACTED]

We questioned \$7,874 (\$5,249 direct costs plus \$2,625 indirect costs) for travel expenses for the PI from [REDACTED], 2012, to attend a conference at the University of [REDACTED] and for collaborative meetings.

Based on the following, we conclude that the travel was not necessary, reasonable, or prudent for the administration of the award:

- UMD did not provide adequate documentation to support this transaction and to support that the costs benefitted the NSF award.
- UMD could not provide an itinerary for the trip; therefore, we could not determine personal versus business days of the trip.
- UMD did not provide support for collaborations with other universities.
- The final report did not support that any collaborations related to the award took place during this trip.
- The NSF award budget did not include travel.

PI Travel to [REDACTED]

We questioned \$3,129 (\$2,086 direct costs plus \$1,043 indirect costs) for travel expenses for the PI while in [REDACTED] from [REDACTED] to [REDACTED] 2012. The PI was in [REDACTED] to attend a

⁸ According to 2 CFR Part 220, Appendix A, Section C.2 and C.3, costs “must be reasonable; they must be allocable to sponsored agreements.... A cost may be considered reasonable if the nature of the goods or services acquired or applied, and the amount involved therefore, reflect the action that a prudent person would have taken under the circumstances prevailing at the time the decision to incur the cost was made. Major considerations involved in the determination of the reasonableness of a cost are: whether or not the cost is of a type generally recognized as necessary for the operation of the institution or the performance of the sponsored agreement.”

workshop from [REDACTED], 2012, to speak at a seminar on [REDACTED] 2012, and to attend a workshop as an invited speaker from [REDACTED] to [REDACTED], 2012.

Based on the following, we conclude that the travel was not necessary, reasonable, or prudent for the administration of the award:

- The travel did not clearly benefit the award.
- UMD did not provide any documentation to support that the PI attended the workshops and seminar.
- International travel to [REDACTED] was not listed in the final report, nor was there mention of the workshops or the seminar.
- The revised NSF award budget was entirely for salaries. No travel was included in the award budget.

Excessive Lodging Charges

We questioned \$1,617 (\$1,470 direct costs plus \$147 indirect costs) for excessive lodging charges while the PI was in [REDACTED], for collaborative meetings. The PI charged \$3,673 for 10 nights lodging in [REDACTED] (\$367 per night), at a 4.5-star luxury hotel. The U.S. Department of State per diem rate for lodging in [REDACTED], in [REDACTED] 2014 was \$220. Although UMD does not follow the Federal Travel Regulation and related per diem rates for lodging, UMD travel policies state every effort should be made to ensure that lodging costs are reasonable and appropriate, but does not state how this determination should be made. Therefore, we found \$1,470 (\$147 per night) of the lodging charges to be excessive and unreasonable.

We also questioned \$602 (\$396 direct costs plus \$206 indirect costs) for excessive lodging charges while the Co-PI was in [REDACTED], to attend a conference. The Co-PI charged \$788 for 4 nights lodging in [REDACTED] (\$197 per night). Using the U.S. General Services Administration per diem rate for lodging in [REDACTED], in [REDACTED] 2014 as a guideline to determinable reasonableness (\$98 per night), we found \$396 (\$99 per night) of the lodging charges to be excessive and unreasonable.

Unreasonable Allocation of Travel Costs

We questioned \$1,217 (\$1,095 direct costs plus \$122 indirect costs) for 69 percent of the cost of airfare charged to one NSF award. The airfare is described in Table 5.

Table 5. Breakdown of Airfare

Destination		Date
[REDACTED]	to [REDACTED]	[REDACTED], 2013
[REDACTED]	to [REDACTED]	[REDACTED], 2013
[REDACTED]	to [REDACTED]	[REDACTED], 2013
[REDACTED]	to [REDACTED]	[REDACTED], 2013

Source: Auditor analysis of questioned airfare

The purpose of the trip was to attend a conference and workshop in [REDACTED], from [REDACTED] to [REDACTED] 2013. The stopover in [REDACTED] from [REDACTED] to [REDACTED] 2013, was for personal time and did not benefit the NSF award. Although 18 out of the 26 travel days (69 percent) were for personal time, the airfare was charged 100 percent to the NSF award. UMD did not provide support that a flight comparison was conducted. Therefore, we questioned 69 percent of the cost of the airfare as it was not allocable to the NSF award.

UMD personnel did not adequately review the expenditures charged to the NSF awards, which resulted in unreasonable travel costs. Without a process to ensure costs are reasonable and allowable, there is increased risk that funds may not be used as required to accomplish the necessary project objectives in accordance with Federal and NSF requirements.

Travel After Award Expiration

We questioned \$1,126 (\$751 direct costs plus \$375 indirect costs) charged to one NSF award for travel expenses for the Co-PI to attend a conference in [REDACTED], from [REDACTED], 2013. The NSF award expired on August 31, 2013. The travel occurred after the NSF award expired; therefore, it could not benefit the award.⁹

Recommendations

We recommend that NSF's Director of the Division of Institution and Award Support:

1. Resolve the \$24,559 in questioned costs, and direct UMD to repay or otherwise remove the sustained questioned costs from its NSF awards.
2. Direct UMD to strengthen its administrative and management controls and processes over travel costs, including identifying guidelines for determining reasonableness of lodging costs.

Summary of Awardee Response

UMD partially agreed with our conclusions for two of the three transactions for travel that was not reasonable and necessary. UMD disagreed with our conclusions for the unreasonable allocation and travel after award expiration findings.

Travel was Not Reasonable and Necessary

- For the PI travel to [REDACTED], UMD noted that the traveler was unable to attend a conference due to a medical issue, creating an unavoidable absence. UMD agreed that MI&E and hotel costs beyond the initial day of travel, and the cost to travel back to the U.S. should not have been charged, and will return those funds, totaling \$6,786. UMD believes that the allowability of the travel should not be questioned as the conference itself was in

⁹ According to 2 CFR Part 220, Appendix A, C.4, "A cost is allocable to a particular cost objective...if the goods or services involved are chargeable or assignable to such cost objective in accordance with relative benefits received or other equitable relationship. Subject to the foregoing, a cost is allocable to a sponsored agreement if it is incurred solely to advance the work under the sponsored agreement; it benefits both the sponsored agreement and other work of the institution, in proportions that can be approximated through use of reasonable methods...is deemed to be assignable in part to sponsored projects."

support of the sponsored research, and the actual airfare costs were allowable, reasonable, and reflect prudent decision making.

- For the PI travel to the University of [REDACTED], UMD partially agreed with the finding. UMD stated the conference attendance and associated travel costs for the time at the conference are both allowable and reasonable. UMD agreed that costs for meals provided at the conference, post conference M&IE, and excessive airfare costs incurred due to the change of the return flight, totaling \$3,176 should be refunded to NSF.
- For the PI travel to [REDACTED], UMD disagreed with our finding and stated the PI attended a workshop on [REDACTED] to [REDACTED], 2012, spoke at a seminar on [REDACTED], 2012, and attended a workshop as an invited speaker from [REDACTED] to [REDACTED], 2012, which were all related to and provided benefit to the sponsored research.
- For the excessive lodging charges, UMD disagreed with our finding and noted that UMD does not follow GSA rates for lodging and that the costs charged were consistent with UMD travel policy and were properly authorized and approved.

Unreasonable Allocation

UMD disagrees with this finding. UMD stated that neither UMD nor Federal policy prohibit mixing official and personal travel. In such instances, a proxy for airfare cost differential is not the overall length of the trip, versus official travel days. Rather, a flight comparison that examined the cost of a hypothetical return after nine days of official time versus the actual return after 26 days. Should the actual return cause an increase in airfare, the difference would be disallowed. In this case, the cost of airfare resulted in an insignificant difference.

Travel After Award Expiration

UMD disagreed with this finding, stating that the cost was moved to a different NSF award and that the travel was related to the sponsored research.

See Appendix A for the complete UMD response.

Auditors' Additional Comments

Travel was Not Reasonable and Necessary

For the PI travel to [REDACTED], UMD's comments did not change our view that the travel provided no benefit to the award; therefore, it should not have been charged.

For the PI travel to the [REDACTED], UMD's comments did not provide evidence that this travel was reasonable or necessary for the award.

For the PI travel to [REDACTED], UMD's comments did not provide any additional information or address any of the specific factors identified in the finding. Therefore, our recommendations remain unchanged.

For the excessive lodging charges, UMD did not provide any evidence that efforts were made to ensure that the lodging costs were reasonable and appropriate. Therefore, our recommendations remain unchanged.

Unreasonable Allocation

NSF should work with UMD to determine an appropriate split between the personal and business aspects of the trip and then request UMD reimburse or credit NSF for the personal portion.

Travel After Award Expiration

UMD's response did not adequately address this portion of the finding. UMD did not provide any evidence that this cost was transferred to another NSF award. Therefore, we are still questioning the charge to the expired NSF award.

Finding 7: Unreasonable Cost Transfers

We questioned four transactions totaling \$13,905 for cost transfers made on four NSF awards relating to travel costs and equipment. Specifically, we questioned the following:

Transfer to NSF Award [REDACTED]

We question \$1,791 (\$1,194 direct costs plus \$597 indirect costs) for a transfer of costs on November 5, 2013, related to travel expenses from one NSF award to another NSF award. The Journal Voucher supporting the transfer stated, in part, “[Journal Voucher] to remove account deficit and to assign travel charge to account designated by PI.” Federal regulations prohibit charging costs to an award due to a deficit on another award; therefore, we questioned these costs.¹⁰

Transfer to NSF Award [REDACTED]

We questioned \$1,649 related to a transfer of equipment purchased more than 3 years prior to the date of the transfer. The transfer was made on December 18, 2014, on an award that expired on September 30, 2014, after an NCE extended the expiration date. The NCE, dated August 30, 2013, stated that the remaining funds would be primarily used to support the graduate student working on the award.

The equipment, totaling \$10,487, was purchased in July 2011 using money from a seed grant the PI received. In 2014, UMD decided to move a portion of the costs, \$1,649, to the NSF award to recover some costs for the seed fund. UMD stated that available funds on the NSF grant were used and the remainder of the cost was covered by the seed grant. UMD also stated that when the award was ready to be closed out, the PI realized that this item had not been charged to this award even though it had been used for the project. It does not appear reasonable to transfer equipment costs to an award more than 3 years after the costs were incurred to use up remaining funds that were supposed to be used to support a graduate student; therefore, we questioned these costs.

Transfer to NSF Award [REDACTED]

We questioned \$2,346 for lodging charges from December [REDACTED], 2013, for the PI to attend a professional meeting. The lodging charges were transferred from NSF award [REDACTED] to NSF award [REDACTED]. Both awards have the same PI, and according to the PI, both awards had very similar scientific objectives, as award [REDACTED] was a follow-on to award [REDACTED].

It appears the funds were transferred from the old award to the new award due to funding considerations, which violates NSF’s policies concerning renewed grants¹¹. The day prior to the

¹⁰ 2 CFR Part 220 Appendix A, C.4.b. states, “Any costs allocable to a particular sponsored agreement under the standards provided in this Appendix may not be shifted to other sponsored agreements in order to meet deficiencies caused by overruns or other fund considerations, to avoid restrictions imposed by law or by terms of the sponsored agreement, or for other reasons of convenience.”

¹¹ NSF’s *Award & Administration Guide*, NSF 13-1, Chapter I Section E, states, “. . . Renewals to grants, if any, will be in the form of a new grant with a new grant number. Costs incurred under the old grant cannot be transferred to the new grant. Residual funds remaining in the old grant cannot be transferred to the new grant.”

transfer, award [REDACTED] had an available balance of \$818. The travel request, approved on September 25, 2013, lists award number [REDACTED] as benefiting from the travel. The travel expense report signed by the PI on December [REDACTED], 2013, also listed award number [REDACTED] as the award to be charged for travel expenses.

Transfer to NSF Award [REDACTED]

We questioned \$8,119 for lodging charges at a conference in 2014 that were transferred from NSF award [REDACTED] to NSF award [REDACTED]. The lodging charges were incurred from [REDACTED] 19, 2014. The lodging charges were invoiced on February 5, 2014, and the entire lodging cost of \$45,415 was charged to NSF award [REDACTED]. On October 29, 2014, UMD transferred \$8,119 of the lodging costs from NSF award [REDACTED] to NSF award [REDACTED] with the explanation that “Upon final review of the account [REDACTED] it was noticed that the housing costs for the 2014 [REDACTED] Workshop were charged all to one account rather than split between the two accounts.”

NSF award [REDACTED] originally expired on August 31, 2012, but was extended to August 31, 2014, through amendments and a NCE. The transfer was made 2 months after the NSF award expired and 8 months after the charges were originally invoiced. UMD did not provide any documentation to support the allocation methodology for splitting the lodging charges between the two NSF awards.

Recommendations

We recommend that NSF’s Director of the Division of Institution and Award Support:

1. Resolve the \$13,905 in questioned costs, and direct UMD to repay or otherwise remove the sustained questioned costs from its NSF awards.
2. Direct UMD to strengthen its administrative and management policies and procedures relating to cost transfers.

Summary of Awardee Response

UMD partially agreed with our findings for \$1,791 of the \$13,905 of questioned costs. UMD provided a detailed explanation of its cost transfer procedures and a detailed response for each of the four transfers questioned.

Transfer to NSF Award [REDACTED]

UMD agreed with our finding and stated that although the travel costs appeared reasonable, the documentation provided by the PI was insufficient to support the late transfer.

Transfer to NSF Award [REDACTED]

UMD disagreed with our finding. UMD stated that the award was extended through December 31, 2014 and the cost transfer was not late. UMD explained that the equipment in question, though not originally purchased with NSF grant funds, was used to benefit the research.

Transfer to NSF Award [REDACTED]

UMD disagreed with our finding. UMD stated, these overlapping awards were both funded pursuant to the [REDACTED] solicitation, have largely the same overall science objectives, and were awarded with the same PI as the lead. The conference benefited the goals of each award and occurred during the time that both grants were active. UMD believes the costs were allowable under either award, and the PI exercised discretion in transferring these costs.

Transfer to NSF Award [REDACTED]

UMD disagreed with our finding. UMD stated, the management of [REDACTED] moved from one department, Institute for [REDACTED], to another, University of Maryland Institute for [REDACTED] ([REDACTED]), and began charging against the [REDACTED] account, despite the availability of funding in the original [REDACTED] account. Upon further review, the \$8,119 for conference lodging was transferred to the [REDACTED] account. UMD stated that 100% of both awards support [REDACTED]; therefore, the costs are allowable and reasonable to either award.

See Appendix A for the complete UMD response.

Auditors' Additional Comments

Transfer to NSF Award [REDACTED]

UMD's comments are responsive to the issue and NSF should verify that the funds have been reimbursed or credited.

Transfer to NSF Award [REDACTED]

UMD's comments do not change our view that these costs should be questioned. UMD did not provide any additional evidence that this transfer was not made for purposes of convenience and funding considerations, which are not allowable.

Transfer to NSF Award [REDACTED]

UMD's comments do not change our view that these costs should be questioned. UMD did not provide any additional evidence that this transfer was not made for purposes of convenience and funding considerations, which are not allowable.

Transfer to NSF Award [REDACTED]

UMD's comments do not change our view that these costs should be questioned. UMD did not provide any additional evidence that this transfer was not made for purposes of convenience and funding considerations, which are not allowable.

Finding 8: Indirect Costs

We questioned \$12,659 in unallowable indirect costs charged to two NSF awards. The indirect costs were assessed against equipment purchases, which is unallowable in accordance with Federal cost principles.¹²

Specifically, we questioned the indirect costs applied and claimed against the following purchases:

- \$9,791 for indirect costs charged on the purchase of equipment with a cost of \$35,603 on NSF award [REDACTED].
- \$2,868 for indirect costs charged on the purchase of equipment with a cost of \$5,736 on NSF award [REDACTED].

UMD personnel incorrectly coded the above transactions; therefore, indirect costs were improperly allocated to these transactions. Without an effective process to ensure equipment is excluded from modified total direct costs, there is increased risk that funds may not be spent in accordance with Federal requirements.

As a result of our audit, in September 2017, UMD credited back these awards for the amount of indirect costs improperly charged.

Recommendations

We recommend that NSF's Director of the Division of Institution and Award Support:

1. Direct UMD to provide support that it has repaid the \$12,659 of questioned costs.
2. Direct UMD to strengthen its administrative and management controls and processes for reviewing and approving indirect costs charged to NSF awards.

Summary of Awardee Response

UMD agreed with our finding that these two transactions were incorrectly coded, resulting in indirect costs being improperly charged to the awards. UMD stated that it credited these awards for the amount of the indirect costs and will provide evidence for audit resolution. UMD stated it has updated its procedures to strengthen its compliance posture.

See Appendix A for the complete UMD response.

¹² 2 CFR Part 220, Appendix A, Section G.2, states: “. . . F&A [facilities and administrative] costs shall be distributed to applicable sponsored agreements and other benefiting activities within each major function . . . on the basis of modified total direct costs, consisting of all salaries and wages, fringe benefits, materials and supplies, services, travel, and subgrants and subcontracts up to the first \$25,000 of each subgrant or subcontract (regardless of the period covered by the subgrant or subcontract). Equipment, capital expenditures, charges for patient care and tuition remission, rental costs, scholarships, and fellowships as well as the portion of each subgrant and subcontract in excess of \$25,000 shall be excluded from modified total direct costs. . . .”

Auditors' Additional Comments

UMD's comments are responsive to this finding. Once NSF determines that the recommendations have been adequately addressed and the \$12,659 in questioned costs have been returned, this finding should be closed.

Finding 9: Unallowable Public Relation Costs

We questioned \$8,955 charged for unallowable and unnecessary promotional items, which were not in accordance with Federal regulations.^{13,14}

We questioned \$8,955 for the purchase of UMD coffee mugs, canvas tote bags, portfolios, lanyards, and pens. These items, purchased from the UMD Bookstore, were used for the Undergraduate Women in Physics Conference. This purchase was not required by the sponsored agreement, nor was it used to communicate the specific activities or accomplishments of the award.

Additionally, these purchases were not reasonable or necessary charges in accordance with Federal regulations.¹⁵ The conference was held January 2014, which was 3.5 months after the award expired. These public relation purchases were not used during the award period and were not necessary for the performance of this NSF award.

UMD personnel did not adequately review the expenditures charged to the NSF awards, which resulted in unallowable and unnecessary costs. Without a process to ensure costs are allowable and necessary, there is increased risk that funds may not be used as required to accomplish the project objectives in accordance with Federal and NSF requirements.

Recommendations

We recommend that NSF's Director of the Division of Institution and Award Support:

1. Resolve the \$8,955 in questioned costs, and direct UMD to repay or otherwise remove the sustained questioned costs from its NSF awards.
2. Direct UMD to strengthen its administrative and management controls and processes for reviewing costs to ensure that unallowable public relation items are not charged to NSF awards.

Summary of Awardee Response

UMD disagreed with this finding and stated the supplies were for STEM outreach activities, which continued through the period of the no-cost extension. The supplies were purchased specifically for a conference for undergraduate women in physics and the costs are consistent with 2 CFR Part 220, as they supported outreach via the conference, a purpose of the award. Additionally, the NSF proposal description and supporting budget justification were explicit in their commitment to the robust outreach component each describes. This outreach had the dual purpose of implementing

¹³ According to 2 CFR Part 220, Appendix A, J.1., "d. The only allowable public relations costs are: (1) Costs specifically required by the sponsored agreement; (2) Costs of communicating with the public and press pertaining to specific activities or accomplishments which result from performance of sponsored agreements (these costs are considered necessary as part of the outreach effort for the sponsored agreement)"

¹⁴ According to 2 CFR Part 220, Appendix A, J.1.f.3, "Unallowable advertising and public relations costs include . . . [c]osts of promotional items and memorabilia, including models, gifts, and souvenirs"

¹⁵ According to 2 CFR Part 220, Appendix A, C.3, "Major considerations involved in the determination of the reasonableness of a cost are: whether or not the cost is of a type generally recognized as necessary for the operation of the institution or the performance of the sponsored agreement."

the goals of this specific research and addressing the principle of broader impact that is part of NSF merit review.

See Appendix A for the complete UMD response.

Auditors' Additional Comments

UMD's comments did not change our view that these are unallowable promotional items that were not required as part of the NSF award nor were they used to communicate specific activities or accomplishments of the award. Additionally, UMD's comments did not change our view that the conference was after the end of the award period, therefore these purchases could not have been considered necessary for the administration of the award. As a result, our recommendation remains unchanged.

A handwritten signature in blue ink that reads "WithumSmith+Brown, PC". The signature is written in a cursive, flowing style.

WithumSmith+Brown, PC
April 30, 2019

Appendix A: Awardee Response



DIVISION OF RESEARCH

OFFICE OF THE VICE PRESIDENT FOR RESEARCH

2133 Lee Building
College Park, Maryland 20742-5125
301.405.4175 TEL 301.405.8386 FAX

April 22, 2019

[REDACTED]
Senior Manager
WithumSmith+Brown
4600 East-West Highway, Suite 900
Bethesda, MD 20814

Dear [REDACTED]

The University of Maryland, College Park (the University or UMD) provides these comments in response to the National Science Foundation Office of the Inspector General (NSF-OIG) Performance Audit of Claimed Costs for NSF awards conducted by WithumSmith+Brown. The audit covered the period beginning January 1, 2013, and ending December 31, 2015. The auditors tested 300 judgmentally selected transactions, totaling more than \$3.1 million. Of that total, the auditors identified 39 transactions with a total \$357,108 of questioned costs charged to 34 NSF awards, across nine findings.

The University takes the audit process seriously, as an integral component of our internal controls structure. Regular audits, both internal and external, assist UMD management in validating where our internal controls are effective, and where we might implement improvements. It is within this context that we have reviewed the auditors' findings and recommendations, analyzed each, and provide our response. While we do not agree with every finding, we will use this report to further enhance our overall systems of compliance and controls.

A summary of our position on the 39 findings reveals we agree with 7 findings, partially agree with 2 findings and disagree with 30 findings. Prior to the conclusion of the audit we refunded \$57,706 and agree to refund another \$14,204 and will provide documentation to that effect. We will work with NSF audit resolution to resolve the remaining \$285,198 in questioned costs.

Our response to the report follows, organized by individual finding.

Finding 1: Unreasonable Payroll Transfers

The auditors questioned as unreasonable **\$101,937** in salary expenses to four NSF awards, citing 2 CFR 220 Appendix A, Section C.4.b, noting "costs cannot be shifted to other grants to meet deficiencies caused by overruns or for other reasons of convenience."

UMD Response

The disaggregation of the \$101,937, with the University's response on each transaction, follows:

Unreasonable Payroll Cost Transfers Due to Revised Effort Reports

- **\$30,804 was questioned for 2 months of salary and wages classified as unreasonable due to revised effort reports. The University disagrees with this finding.** The PI in question serves on a dual appointment between the Institute for [REDACTED] [REDACTED]. Delayed communication between these departments, as well as late communication from the PI concerning the error in posting this transaction, resulted in the late cost transfer. The original salary of \$30, 804 was charged to his UMD account, when it should have been charged to the NSF account. Further, it appears that the auditors misunderstood the accounting system coding that distinguishes departmental accounts from federal accounts by incorrectly concluding that the salary had been overcharged on the NSF award. Consistent with UMD cost transfer procedures, Sponsored Program Accounting and Compliance (SPAC) reviewed the payroll cost transfer and determined it is allowable and reasonable as a charge to the NSF award in question.

Unreasonable Payroll Cost Transfers after Award Expiration

- **\$28,004 was questioned as unreasonable payroll cost transfers after award expiration. The University disagrees with this finding.** Time and Effort certification occurs twice a year at UMD. In addition, salary distributions are initially made based on how an individual is expected to expend effort over an extended period of time and corrections to these distributions when actual effort is determined to be different, represent legitimate transactions to ensure payroll charges match effort expended. Changes to payroll distribution done at the time of effort certification are not subject to the UMD cost transfer procedure's 90-day cost transfer limitation. Departments are expected to review sponsored accounts monthly and make changes as soon as information is available. For awards that expire in the middle of an effort reporting period, departments are responsible for ensuring the accuracy of the salary charges before SPAC issues a final expenditure report.

The PI in question was named as the project leader [REDACTED] and as such [REDACTED] effort is allowable to the award. An administrative error caused a delay in posting [REDACTED] salary to the correct award due to a split in appointment between two departments, and a lack of communication between the two units.

UMD will take steps to tighten controls and enhance payroll coding procedures, particularly in cases where split appointments exist.

Payroll Coding Errors

- **\$25,999 and \$17,130 in payroll coding errors were identified. The University agrees with these findings** and refunded the charges during the course of the audit. We will provide evidence of the refund during resolution.

Finding 2: Unreasonable Purchases of Equipment

The auditors questioned purchases near the end of award periods for items that did not appear reasonable or allocable to the awards charged totaling **\$79,956**.

UMD Response

The University disagrees with the findings and the questioned costs cited. UMD believes these costs were reasonable due to the project-specific circumstances surrounding the purchases. Consistent with federal and NSF policy, UMD believes that the equipment purchases are all supportable allowable, allocable and reasonable under the original awards, and meet the test of reasonableness for subsequent use on related research.

Each finding and related expenditure(s) were reviewed with the PIs, as were their justifications indicating the purchases were necessary to achieve and strengthen final award results. Based on this information, UMD determined the charges were allowable and necessary to achieve project outcomes, therefore meeting the standard for reasonableness.

NSF Award Administration Guide (AAG), Chapter V.1.c states NSF funds may not be expended subsequent to the expiration date of the grant except to liquidate valid commitments that were made on or before the expiration date.

In addition, [AAG Chapter III.E.2](#), for example, commitment of project funds is valid when specialized (research) equipment is ordered well in advance of the expiration date but where, due to unusual or unforeseen circumstances, delivery of such equipment is delayed beyond the expiration date. Also, the Award Administration Guide, Chapter [V.B.2.d](#) on General Purpose Equipment states, “. . . Expenditures for general purpose equipment are normally unallowable unless the equipment is *primarily or exclusively used in the actual conduct of research*. Equipment purchased under one award does not preclude its use under other related research projects. In many cases, research projects are renewed and continuing research efforts into the future.

The items of equipment purchased can be used to advance the research of the specific award as well as related research that may continue on other on-going projects at an institution. In addition, these items of equipment delivered post-expiration can be for data collection and completion of the final reports.”

The auditors identified two transactions and questioned costs charged to two awards, totaling \$79,956. The individual findings, and the University’s response to each, follow:

- **\$72,112 for the purchase of a liquid helium system was questioned, citing the allocation methodology. The University disagrees with this finding.** The allocation methodology was based on approximate estimated usage for the different awards. This equipment was purchased to be used predominantly for the NSF [REDACTED] award, though it would also be used for a [REDACTED] project which is related to this NSF research.
- **\$2,169 used to purchase a laptop for a PI was questioned as not allowable or allocable to the award charged. The University disagrees with this finding.** The PI confirmed that this computer was the main workhorse for all the sponsored research computer simulations and calculations for the past five years, as well as associated paper writing, thus serving as [REDACTED] main research tool. The sponsored research required high memory and a fast, multi-core processor for numerical master equation calculations that were used for most of the project’s resulting papers, and where the [REDACTED] award support was acknowledged.

Additionally, the auditors questioned costs charged to three NSF awards totaling \$5,675, citing general purpose computers near award expiration. **The University disagrees to all three findings.**

- **\$1,986 for the purchase of a laptop computer, wireless mouse, and screen printer.** The PI used the computer for writing related to [REDACTED] research and it was able to handle the complex computations foundational to [REDACTED] research.
- **\$1,849 for the purchase of a computer.** Students on this project began working on deep learning and needed access to the latest GPU hardware as replacement for previously purchased machines. This PC was purchased to support that configuration needed for the project.
- **\$1,840 for the purchase of a computer.** The laptop was used exclusively for this project, during which time the PI traveled extensively between Maryland and [REDACTED]. Additionally, the project involved extensive coordination/correspondence with multiple people and units at two different institutions (University of Maryland and [REDACTED]), including jointly advised graduate students and postdocs. Among the project activities the laptop supported were corresponding with the [REDACTED] PI and other project personnel; review of manuscripts/theses produced by students on the project; and coordination of project expenditures between the PI's department and laboratories at the [REDACTED].

Finding 3: Inadequate Documentation

Four transactions totaling \$45,628 were questioned for inadequate documentation to support the charges to the NSF awards.

UMD Response

The University partially agrees with the auditors' finding. The individual transactions, with the University's position on each, follow:

- **\$38,500 (\$26,000 in direct costs and \$12,500 in indirect costs) charged to an award for a consulting firm to perform data collection surveys. The University disagrees with this finding.** The proposed research resulted in an award for a collaborative project involving PIs at the University of Maryland and the University of [REDACTED] respectively. Post award, there was a budget modification to provide funding to Westat to perform data collection surveys in support of the research. The original scope of the project was maintained; as such, NSF approval was not required.
- **\$5,000 for payment to a professional society for student participation in a conference. The University disagrees with the finding and the questioned costs.** Supporting documentation includes the proposal abstract that explicitly cites as a purpose of this award the students' participation in this conference as among the activities they would engage. Additionally, the invoice for the conference fee was provided. UMD does agree that the wrong object class code was used in recording the costs and a correction was made. SPAC reviewed and accepted the documentation for the correction. It is available and will be provided to resolve this finding.

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- **\$1,918 (\$1,292 in direct costs and \$626 in indirect costs) for an equipment purchase for which adequate support was not provided. The University agrees with this finding.** As noted in the auditors' report, after reviewing the transaction, UMD agreed and refunded the costs questioned. Documentation is available for this correction.
- **\$210 for a surcharge on a vendor invoice totaling \$3,671 for an equipment purchase. The University agrees with this finding.** After reviewing the transaction, UMD will return the \$210 cost questioned. We will provide documentation during resolution.

Finding 4: Purchases Near or After Award Expiration

Five transactions totaling **\$37,812** in equipment purchases were questioned as unreasonable or unnecessary to the awards charged.

UMD Response

The University disagrees with the findings and the questioned costs cited. UMD believes these costs were reasonable due to the project-specific circumstances surrounding the purchases. Consistent with federal and NSF policy, UMD believes that the equipment purchases are all supportable under existing assistance cost policy for allowability, allocability and/or reasonableness. In addition, UMD believes these costs meet the test of reasonableness for subsequent use on related research. Each finding and related expenditures were reviewed with the PIs that led UMD to determine the charges were allowable and necessary to achieve project outcomes. We have justification from the PIs indicating the purchases were necessary to achieve and strengthen the final award results.

NSF Award Administration Guide (AAG), [Chapter V.A. 2.C](#) states NSF funds may not be expended subsequent to the expiration date of the grant except to liquidate valid commitments that were made on or before the expiration date.

In addition, [AAG Chapter III.E.2](#), for example, commitment of project funds is valid when specialized (research) equipment is ordered well in advance of the expiration date but where, due to unusual or unforeseen circumstances, delivery of such equipment is delayed beyond the expiration date.

In addition, the Award Administration Guide, Chapter V.1.d on General Purpose Equipment states, “. . . . Expenditures for general purpose equipment are normally unallowable unless the equipment is *primarily or exclusively used in the actual conduct of research*. Equipment purchased under one award does not preclude its use under other related research projects. In many cases, research projects are renewed and continuing research efforts into the future. The items of equipment purchased can be used to advance the research of the specific award as well as related research that may continue on other on-going projects at an institution. In addition, these items of equipment delivered post-expiration can be for data collection and completion of the final reports.”

The auditors questioned costs on five separate multi-year awards; the University's responses to each follow:

- **\$25,350 for the purchase of a vacuum chamber, received after the award expired. The University disagrees with this finding.** The original NSF award was extended, and the sponsored research remained ongoing, using clusters in place of commercial nanoparticles. In parallel, in 2015, the research team began to also use the vacuum chamber for related [REDACTED] funded experiments in proton acceleration.
- **\$5,117 for the purchase of a 3D printer received after the award expired. The University disagrees with this finding.** The original award was extended through 12/13. The order for the 3D printer was placed 08/13 during the performance period, but due to production delays the 3D printer was delivered 02/14 after the performance period end date. Nevertheless, the I-corps Program is focused on business launch activities, which continued as expected after the performance period and the printer was used for its intended business development purpose (technology demonstration) consistent with the NSF Program goals.
- **\$3,589 for the purchase of optical mirrors received 22 days after the award expired. The University disagrees with this finding.** These items, a variety of optical mirrors, were used in the fabrication of the [REDACTED]. They were needed for operation of the equipment. The [REDACTED] components were identified in the approved budget, were ordered prior to the end of the award, and continued to support the research once the award ended.
- **\$2,385 for the purchase of three computer monitors that were received approximately six weeks prior to the end of the award period. The University disagrees with this finding.** The original award supported a computer-intensive examination of the [REDACTED]. The project was followed by an intensive study of the [REDACTED]. These purchases allowed the research team to replace failing equipment in order to finish the original grant and to continue the related, follow-on research.
- **\$1,371 for the supplies purchased on the last day of the award for a conference to be held after award expiration. The University disagrees with this finding.** The purchase provided materials and supplies for sponsored STEM outreach activities, which continued through the no-cost extension period. The supplies were specifically used for the Conference for Undergraduate Women in Physics (CUWiP), a three-day regional conference for undergraduate physics majors held at UMD from January 17-19, 2014. The purchase was used exclusively to support the UMD-MRSEC's commitment to enlarge the pool of students who become our future scientists and to advance participation of groups traditionally underrepresented in physics. The conference supported the goals of the conference.

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Finding 5: Unreasonable Allocation

The auditors questioned six transactions as either not reasonable or not supported. These transactions totaled \$31,697 in costs.

UMD Response

The University disagrees with the auditors' finding. The individual transactions, with the University's position on each, follow:

- **\$7,235 in lab equipment. The University disagrees with this finding.** This equipment purchase is for an [REDACTED] laser table and legs from [REDACTED]. It is jointly sponsored (50/50) by the department of chemistry and biochemistry. The table is used to house sensitive [REDACTED] used to probe the optical properties of [REDACTED] which is a major aim of this NSF award.
- **\$6,351 for software licenses. The University disagrees with this finding.** As confirmed with the PI, this software was used to design all photonic devices fabricated and tested in this project.
- **\$5,083 for the purchase of an equipment accessory, charged 100% to the NSF award. The University disagrees with this finding.** The PI confirmed that this equipment was a substantial benefit to the project. The [REDACTED] became a critical tool in characterizing the [REDACTED] by different approaches. It helped identify [REDACTED] improve [REDACTED] and optimize [REDACTED] performance.
- **\$5,068 for the purchase of computer equipment that was allocated 31.72 percent the NSF award. The University disagrees with this finding.** As noted in the original proposal, this research entails both substantial data storage and data computation and is reliant on data contributed by the community. This last point made predicting with accuracy how large the data set would be impossible. As it stands, the PI has compiled over 100 million measurements, which is much greater than initial estimates, necessitating the purchase of the server to handle the volume of data, computation, and web traffic capacity that would not be able to be satisfied with currently-available equipment. The server will store all data, be used for the computations, and eventually host the website, along with relevant applications associated with the sponsored research to maximize its utility for the community.
- **\$4,940 of \$24,698 and charged 100 percent to one NSF award, and determined it should have been charged to another NSF award. The University disagrees with this finding.** As verified with the PI, the equipment in question was used to test and validate the activities of the DC/DC converter. As such, it is foundational and integral to the goals of this project.

- \$3,020 of \$15,099 for the purchase of lab equipment charged to an NSF award, determining that only 80% of the cost of the equipment was allowable. The University disagrees with this finding. This is a [REDACTED] tester from [REDACTED]. It was applied to mechanically [REDACTED] the goal of [REDACTED] characterization, which is a major aim of this award. In discussions with the PI, it is the SPAC staff's professional judgment that the allocation was reasonable.

Finding 6: Unreasonable Travel

The auditors questioned \$24,559 in travel costs, among three transactions, that did not appear to them to be reasonable and necessary or as not in compliance with NSF requirements.

UMD Response

The University partially agrees with the auditors' finding. The individual transactions cited by the auditors, with the University's position on each, follow:

PI Travel to Edinburgh, Scotland

- \$8,994 for travel expenses for the PI for a trip to [REDACTED] from [REDACTED] to [REDACTED] 2014. The purpose of the trip was to attend a conference from [REDACTED] to [REDACTED] 2014. However, the PI was unable to attend the conference due to a medical issue. The travel expense was not reasonable as it did not benefit the award. **The University partially agrees with this finding and will return \$6,786.20 of the costs questioned.** We will provide documentation of the refunded costs during resolution.

The allowability of the travel was not questioned, as the conference itself was in support of the sponsored research, and the proper approvals for the costs were secured. **UMD disagrees that the travel costs were unreasonable.** The trip commenced as planned. Upon arrival, the PI [REDACTED] thus missing the conference. This was not a circumstance where the PI failed to attend without cause – [REDACTED] absence was unavoidable. [REDACTED] there is a reasonable expectation he would return to the U.S.

The actual airfare costs were both allowable and reasonable and reflect prudent decision making, as required by 2CFR Part 220. The PI's subsequent illness once travel commences doesn't render the initial decision to incur those costs not prudent, nor does the illness render the costs unreasonable.

UMD agrees that neither MI&E nor hotel costs should be charged, beyond the initial day of travel and the travel day back to the U.S. and will return those funds. UMD has also conducted a cost comparison for airfare and will return the difference. The \$6,786.20 we are agreeing to return represents the MI&E, hotel, and airfare differentials.

PI Travel to University of [REDACTED]

- \$7,874 for travel expenses were questioned for the PI from [REDACTED] to [REDACTED] 2012, to attend a conference at the University of [REDACTED] and for collaborative meetings.

The University partially agrees with this finding. The conference attendance, and the associated travel costs for the time of the conference are both allowable and reasonable. In addition, the PI's time prior to the conference was spent in collaboration meetings at the [REDACTED]. These meetings and the conference were directly related to the sponsored research, and the PI engaged in collaboration with PI colleagues, for the benefit of the award. To that end, these costs are justified. We agree that costs for meals provided at the conference, post-conference MI&E, and excessive airfare costs incurred due to change of return flight should also be refunded. These agreed disallowances of \$750 and \$2,456.10, respectively, total \$3,176.10. We will provide documentation of the returned funds during resolution.

PI Travel to [REDACTED]

- \$3,129 for travel expenses were questioned for the PI while in [REDACTED] from [REDACTED] to [REDACTED] 2012. The PI was in [REDACTED] to attend a workshop from [REDACTED] 2012, to speak at a seminar on [REDACTED] 2012, and to attend a workshop as an invited speaker from [REDACTED] to [REDACTED] 2012.

The University disagrees with this finding. All three trips were related to and provided benefit to the sponsored research. As such, the costs associated with these trips were allowable and reasonable. We have documentation to support our position and will supply it during resolution.

Excessive Lodging Charges

The auditors questioned as excessive, lodging for two trips, one to [REDACTED] and one to [REDACTED] noting that the rates were not consistent with the GSA schedules for lodging.

- \$1,617 (including applicable F&A) of a total of \$3,673 for 10 nights in [REDACTED] for collaborative meetings.
- \$602 (including applicable F&A) of \$788 charged for four nights in [REDACTED] to attend a conference.

The University disagrees with this finding. The University does not follow GSA rates for lodging and the costs charged are consistent with UMD travel policy and were properly authorized and finally approved.

Unreasonable Allocation of Travel Costs

- \$1,217 for 69 percent of the cost of airfare charged to one NSF award was questioned due to personal travel incorporated into the trip. The auditors found no documentation that UMD conducted a flight comparison, so questioned 69 percent of the costs charged.

The University disagrees with this finding. Neither UMD nor federal policy prohibit mixing official and personal travel. In such instances a proxy for air fare cost differential is not the overall length of the trip, versus official travel days. Rather, a flight comparison that examined the cost of a hypothetical return after nine days of official time versus the actual return after 26 days. Should the actual return cause an increase in airfare, the difference would be disallowed. In this case, the cost of airfare resulted in an insignificant difference.

Travel after Award Expiration

- **\$1,126 charged to one NSF award for travel expenses for the Co-PI to attend a conference in [REDACTED] from [REDACTED] 2013.** The NSF award expired on August 31, 2013. The auditors questioned the costs as travel occurred after the NSF award expired, so could not benefit the award.

The University disagrees with this finding. The cost was moved to a different NSF award and the travel was related to the sponsored research.

Finding 7: Unreasonable Cost Transfers

The auditors questioned four transactions, on 4 NSF awards totaling **\$13,905** for cost transfers relating to travel costs and equipment.

UMD Response

The University partially agrees with the auditors' findings. The University of Maryland cost transfer procedures require that each principal investigator is responsible for ensuring that transfers of cost to their sponsored projects are made promptly, supported by documentation with a full explanation/need for the transfer and the correlation of the charge to the project to which the transfer is being made. Our procedures are consistent with both federal and sponsor policies. Each cost transfer must be reviewed by a UMD Departmental Business Manager and sent to SPAC at the time it is being completed in KFS, the University's accounting system of record. In the normal course of business, cost transfers are to be prepared within 90 days of the date of the original transaction. Cost transfers made after this period of time require SPAC approval and are made under the following conditions:

- The cost is an allowable, allocable, and reasonable charge to the project.
- The transfer is supported by adequate documentation fully explaining the need for the transfer and certified by the PI and Departmental Business Manager, as described above.
- Transfers which are not made promptly, due to extenuating circumstances, must include an adequate explanation as to why there was a delay in processing the transfer.
- Authorized users are to prepare cost transfers for sponsored projects fund accounts in the KFS. Manual journal entries in the University's financial accounting system must include a reference to the original transaction entered in the accounting system. The documentation to support the cost transfer is detailed in the required documentation and includes, but is not limited to:
 - An explanation for the transfer;
 - An explanation of the direct benefit to the funding source;
 - The original source documentation (invoice, receipt, etc.); and,
 - Principal investigator approval (in writing via memorandum or email)

Following are our responses for each of the four transactions cited by the auditors:

Transfer to NSF Award [REDACTED]

- **\$1,791 (\$1,194 direct costs plus \$597 indirect costs) for a transfer of costs on November 5, 2013, related to travel expenses from one NSF award to another NSF award. The University agrees with the auditors' finding.** These travel costs may meet the test of reasonability, as described in the Uniform Guidance and University of

Maryland policies. However, the documentation provided by the PI was insufficient to support the late cost transfer. We will provide documentation of the returned funds during resolution.

Transfer to NSF Award

- **\$1,649 related to a transfer of equipment purchased more than 3 years prior to the date of the transfer. The University disagrees with the auditors' finding.** The award in question was extended through December 31, 2014, and the cost transfer was not late. The equipment in question, though not originally purchased with NSF grant funds, was used to benefit the research. The PI documented and submitted his approval of the cost transfer for a portion of the equipment charges. SPAC reviewed the documentation and exercised their professional judgement and experience within the context provided by relevant federal and UMD financial and administration policies and guidelines, to determine the costs were both allowable and reasonable charges to this award.

Transfer to NSF Award

- **\$2,346 for lodging charges from December 8-15, 2013, for the PI to attend a professional meeting. The lodging charges were transferred from NSF award to NSF award. The University disagrees with the auditors' finding.** These overlapping awards were both funded pursuant to the solicitation, have largely the same overall science objectives, and were awarded with the same PI as lead. The conference benefited the goals of each award and occurred during the time that both grants were active. The costs were allowable under either award, and the PI exercised discretion in transferring these costs; SPAC reviewed and accepted the documentation for the cost transfer, and determined it was a reasonable.

Transfer to NSF Award

- **\$8,119 for lodging charges at a conference in 2014 that were transferred from NSF award to NSF award. The University disagrees with the auditors' finding.** The management of moved from one department, Institute for to another, University of Maryland for and began charging against the account, despite the availability of funding in the original account. Upon further review, the \$8,119 for conference lodging was transferred to the ISR account. 100% of both awards support so are allowable and reasonable. SPAC reviewed and accepted the documentation for the cost transfer.

Finding 8: Indirect Costs

The auditors questioned \$12,659 in unallowable indirect costs charged to two NSF awards. The indirect costs were assessed against equipment purchases, which is unallowable in accordance with Federal cost principles.

UMD Response

The University agrees with the auditors' finding that these two transactions were incorrectly coded, therefore indirect costs were improperly allocated to these transactions. The specific transactions, and UMD's response, follow:

- \$9,791 for indirect costs charged on the purchase of equipment with a cost of \$35,603.
- \$2,868 for indirect costs charged on the purchase of equipment with a cost of \$5,736.

UMD credited these awards for the amount of indirect costs improperly charged and UMD will provide evidence for resolution. Further, we have updated our procedures for cost transfers and will issue the update as a part of our effort to continually strengthen our compliance posture.

Finding 9: Unallowable Public Relation Costs

- \$8,955 questioned for unallowable and unnecessary promotional items, which they determined were not in accordance with 2 CFR 220. The auditors determined the purchase was not required by the sponsored agreement, nor was it used to communicate the specific activities or accomplishments of the award, so they questioned the total amount.

UMD Response

The University disagrees with this finding. Supplies were for STEM outreach activities which continued through the period of the no-cost extension. The supplies were purchased specifically for a conference for undergraduate women in physics and the costs are consistent with 2 CFR 220, as they supported outreach via the conference, a purpose of the award. Additionally, the

NSF proposal description and supporting budget justification were explicit in their commitment to the robust outreach component each describes. This outreach had the dual purpose of implementing the goals of this specific research and addressing the principle of broader impact that is part of NSF merit review.

We appreciate the auditors' professionalism and diligence and are committed to working with NSF on the final resolution of the auditors' findings and in the implementation of corrective actions, where warranted.

Should you have any question, please do not hesitate to contact me.

Sincerely,

Denise J. Clark
Associate Vice President of Research Administration

cc: Marchon Jackson, Director, Sponsored Programs Accounting and Compliance

Appendix B: Objective, Scope, Methodology, and Criteria

Objective

To determine if costs claimed by UMD on NSF awards are allowable, allocable, reasonable, and in compliance with NSF and Federal financial assistance requirements.

Scope

Our audit included assessing the allowability, allocability, and reasonableness of costs claimed by UMD through the Award Cash Management Service for the 3-year period beginning January 1, 2013 through December 31, 2015. We obtained from UMD, award transactions comprising all costs claimed to NSF during this period. This provided an audit universe of approximately \$170 million, in more than 405,000 transactions, across 842 individual NSF awards. For transaction testing, we judgmentally selected 300 transactions totaling more than \$3.1 million and utilized a data analytics approach to identify potential risk areas.

The audit work was conducted at the auditors' offices and onsite at UMD in College Park, Maryland. Onsite fieldwork was conducted during May 2017. At the conclusion of our fieldwork, we provided a summary of our results to NSF OIG personnel for review. We also provided the summary of results to UMD personnel to ensure that they were aware of each of our findings and did not have any additional documentation to support the questioned costs.

UMD management is responsible for establishing and maintaining effective internal controls to help ensure that Federal award funds are used in compliance with laws, regulations, and award terms. In planning and performing our audit, we considered UMD's internal controls solely to understand the policies and procedures relevant to the financial reporting and administration of NSF awards. We also evaluated UMD's compliance with laws, regulations, and award terms applicable to the items selected for testing, but not for the purpose of expressing an opinion on the effectiveness of UMD's internal controls over award financial reporting and administration. Accordingly, we do not express an opinion on the effectiveness of UMD's internal controls over its award financial reporting and administration.

This performance audit was conducted in accordance with Generally Accepted Government Auditing Standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for the conclusions based on the audit objective. The auditors believe that the evidence obtained provides a reasonable basis for the conclusions based on the audit objective.

Methodology

Our work required reliance on computer-processed data obtained from UMD and NSF. At our request, UMD provided detailed transaction data for all costs charged to NSF awards for the period January 1, 2013 through December 31, 2015. We also extracted award data directly from NSF's various data systems. To select transactions for further review, we designed and performed

automated tests of UMD and NSF data to identify areas of risk and conducted detailed reviews of transactions in those areas.

We assessed the reliability of the data provided by UMD by 1) comparing costs charged to NSF award accounts within UMD's accounting records to reported net expenditures, as reflected in UMD's financial reports submitted to NSF for the corresponding periods; 2) performing general ledger to sub-ledger reconciliations of accounting data; and 3) reviewing and testing the parameters UMD used to extract transaction data from its accounting records and systems.

After verifying that the population of data was appropriate, we analyzed the data contained in the UMD general ledger and supporting detailed ledgers to identify anomalies, outliers, and aberrant transactions. We then judgmentally selected a sample of transactions to test based on predefined criteria.

Based on our testing, we found UMD's computer-processed data sufficiently reliable for the purposes of this audit. We did not review or test whether the data contained in, or controls over, NSF's databases were accurate or reliable; however, the independent auditors' report on NSF's financial statements for fiscal years 2014, 2015, and 2016 found no reportable instances in which NSF's financial management systems did not substantially comply with applicable requirements.

In assessing the allowability of costs claimed to NSF by UMD, we also gained an understanding of the internal controls applicable to the scope of this audit through interviews with UMD personnel, review of policies and procedures, and conducting walkthroughs as applicable.

Criteria

We assessed UMD's compliance with its internal policies and procedures, as well as the following:

- 2 CFR Part 200, *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards*
- 2 CFR Part 220, *Cost Principles for Educational Institutions* (Office of Management and Budget Circular A-21)
- 2 CFR Part 215, *Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations* (Office of Management and Budget Circular A-110)
- *NSF Proposal and Award Policies and Procedures Guide* (includes the *Grant Proposal Guide* and *Award & Administration Guide*)
- NSF Award Specific Terms and Conditions
- NSF Federal Demonstration Partnership Research Terms and Conditions

Appendix C: Questioned Costs Summary by Finding

Finding	Description	Questioned Costs		Total
		Unsupported	Unallowable	
1	Unreasonable and Unallocable Payroll Transfers	\$ --	\$ 101,937	\$ 101,937
2	Unreasonable Purchases of Equipment	--	79,956	79,956
3	Inadequate Documentation	1,918	43,710	45,628
4	Purchases Near or After Award Expiration	--	37,812	37,812
5	Unallocable Costs	--	31,697	31,697
6	Unreasonable Travel	--	24,559	24,559
7	Unreasonable Cost Transfers	--	13,905	13,905
8	Unallowable Indirect Costs	--	12,659	12,659
9	Unallowable Public Relations Costs	--	8,955	8,955
Total		\$ 1,918	\$ 355,190	\$ 357,108



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