




National Science Foundation • Office of Inspector General
4201 Wilson Boulevard, Suite I-1135, Arlington, Virginia 22230

MEMORANDUM

Date: July 8, 2016

To: Dale Bell
Director, Division of Institution and Award Support

Jamie French
Acting Director, Division of Grants and Agreements

From: 
Marie A. Maguire
Assistant Inspector General for Audit (Acting)

Subject: Audit Report No. 16-1-021,
Columbia University

This memo transmits the WithumSmith+Brown (WSB) report for the audit of costs totaling approximately \$251 million charged by Columbia University (Columbia) to its sponsored agreements with the National Science Foundation (NSF) during the period April 1, 2010 through March 31, 2013.

The auditors found that costs Columbia charged to its NSF sponsored agreements did not always comply with applicable Federal and NSF award requirements. The auditors questioned \$1,201,755 of costs claimed on 53 NSF awards. Specifically, the auditors noted: \$774,976 in senior personnel salary charges that exceeded NSF's two-month limit; \$343,794 in unreasonable equipment, materials, and supplies expenses; \$31,382 in unsupportable and unallocable expenses; \$25,991 in unreasonable and unallowable transactions; \$22,414 in transactions after award expiration; and \$3,198 in purchases before award effective date. These questioned costs resulted in six areas identified where Columbia's controls could be improved to ensure compliance with laws and regulations.

The auditors found that Columbia properly accounted for and segregated NSF ARRA-funded awards in the accounting system. Additionally, the ARRA reports were reasonable, accurate, and timely. For the quarters ending December 31, 2012 and March 31, 2013, expenditures and jobs creation were verified without exception. The allowability of costs reported for these awards were tested in conjunction with the other NSF awards. The auditors questioned \$5,006 in 5 ARRA awards which included 3 awards with expenditures in the amount of \$2,843 related to senior personnel that exceeded the two-month NSF salary limit and 2 awards with expenditures in the amount of \$2,163 related to unreasonable or unallowable transactions. These amounts are reflected in the amounts in the previous paragraph.

The auditors included six recommendations in the report for NSF concerning resolving the questioned costs and strengthening administrative and management controls. Columbia provided its response to the report and recommendations on June 21, 2016 which is attached in its entirety in the report in Appendix A. In accordance with Office of Management and Budget Circular A-50, Audit Followup, please provide a written corrective action plan to address the report's recommendations. In addressing the report's recommendations, this corrective action plan should detail specific actions and associated milestone dates. Please provide the action plan within 60 calendar days of the date of this memorandum.

OIG Oversight of Audit

To fulfill our responsibilities under generally accepted government auditing standards, 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 and NSF officials, as necessary, to discuss audit progress, findings, and recommendations;
- Reviewed the audit report, prepared by WSB to ensure compliance with generally accepted government auditing standards; and
- Coordinated issuance of the audit report.

WSB is responsible for the attached auditor's report on Columbia and the conclusions expressed in the report. We do not express any opinion on the conclusions presented in WSB's 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 Keith Nackerud at 303-844-5745.

Attachment

cc: Alex Wynnyk, Branch Chief, CAAR
Rochelle Ray, Team Leader, CAAR
Michael Van Woert, Executive Officer, NSB
Ruth David, Audit & Oversight Committee Chairperson, NSB
Christina Sarris, Assistant General Counsel, OD
Kaitlin McDonald, Program Analyst, OD

**Columbia University
Audit of Incurred Costs for
National Science Foundation Awards
For the Period April 1, 2010 to March 31, 2013**

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ACRONYMS

AAG	Award & Administration Guide
ACMS	Award Cash Management Service
ARRA	American Recovery and Reinvestment Act of 2009
CFR	Code of Federal Regulation
Columbia	Columbia University
DIAS	Division of Institution and Award Support
FAQ	Frequently Asked Question
FDP	Federal Demonstration Partnership
FFR	Federal Financial Report
IPA	Intergovernmental Personnel Act
NSF	National Science Foundation
OIG	Office of Inspector General
OMB	Office of Management and Budget
PI	Principal Investigator

Independent Auditors' Report

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950 (P.L. 810-507). Its mission is “to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense.” 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. Through grants, cooperative agreements, and contracts, NSF enters into relationships with non-federal organizations to fund research education initiatives and assist in supporting internal program operations. Columbia University (Columbia) is an NSF grant recipient.

Columbia is a private, nonsectarian, nonprofit institution of higher education with activities concentrated at two locations in New York City and extending around the globe. Columbia provides instruction through sixteen undergraduate, graduate, and professional schools. It operates a variety of research institutes and a library system to support its teaching, learning, and research activities. Columbia performs research, training, and other services under grants and contracts with agencies of the federal government and other sponsoring organizations. Columbia enrolls approximately 29,000 full-time and part-time students and employs approximately 14,950 full-time employees, including 5,575 full-time faculty members and research staff. Columbia has maintained consistent growth in their research funding over the last 10 years, and in fiscal year 2013 received \$477.1 million in sponsored research funds. Of the total \$477.1 million, NSF was the second largest contributor at \$77.8 million. Because Columbia is one of the largest recipients of NSF award dollars, NSF-Office of Inspector General (OIG) selected Columbia for audit.

WithumSmith+Brown, under contract with the NSF-OIG, audited the costs claimed by Columbia to NSF for the period beginning April 1, 2010 and ending March 31, 2013. Our audit objectives were to: 1) identify and report on instances of unallowable, unallocable, and unreasonable costs; 2) identify and report on instances of noncompliance with regulations, federal financial assistance requirements, and the provisions of the NSF award agreements related to the transactions selected; and to 3) determine the reasonableness, accuracy and timeliness of the awardee’s American Recovery and Reinvestment Act of 2009 (ARRA) quarterly reporting, including reporting the jobs created under ARRA and grant expenditures for the two most recent quarters.

We conducted this performance audit in accordance with generally accepted government auditing standards which require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that

the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Our objectives, scope, methodology, and criteria are more fully detailed in Appendix B.

Results in Brief

To aid in determining reasonableness, allowability, and allocability of costs, we obtained from Columbia all awards for which costs were reported to NSF during the period of April 1, 2010, through March 31, 2013. This provided an audit universe of approximately \$251 million, in approximately 129,000 transactions, across 920 individual NSF awards.

Of the \$251 million in the universe, our audit questioned \$1,201,755 of costs claimed on 53 NSF awards because Columbia did not comply with federal and NSF award requirements. Specifically, we noted: \$774,976 in senior personnel salary charges that exceeded NSF's two-month limit; \$343,794 in unreasonable equipment, materials, and supplies expenses; \$31,382 in unsupported and unallocable expenses; \$25,991 in unreasonable and unallowable transactions; \$22,414 in transactions after award expiration; and \$3,198 in purchases before award effective date. These questioned costs resulted in six areas identified where Columbia controls could be improved to ensure compliance with laws and regulations.

The universe of NSF ARRA-funded awards included approximately \$30 million of expenditures, in more than 15,000 transactions, across 65 NSF awards. Our review found that Columbia properly accounted for and segregated NSF ARRA-funded awards in the accounting system. Additionally, the ARRA reports were reasonable, accurate, and timely. For the quarters ending December 31, 2012 and March 31, 2013, expenditures and jobs creation were verified without exception. The allowability of costs reported for these awards were tested in conjunction with the other NSF awards. We questioned \$5,006 in 5 ARRA awards which included 3 awards with expenditures in the amount of \$2,843 related to senior personnel that exceeded the two-month NSF salary limit and 2 awards with expenditures in the amount of \$2,163 related to unreasonable or unallowable transactions.

Columbia reviewed and agreed with the facts for \$205,494 in questioned costs: 1) \$135,447 in unreasonable equipment, materials and supplies charges; 2) \$22,564 in unsupported and unallocable expenses; 3) \$25,069 in unreasonable or unallowable transactions; and 4) \$22,414 in transactions purchased after award expiration. Columbia did not agree with \$996,261 in questioned costs: 1) \$774,976 in salary charges that exceeded NSF limits on senior salary; 2) \$208,347 in unreasonable equipment, materials and supplies charges; 3) \$8,818 in unsupported and unallocable expenses; 4) \$922 in unreasonable or unallowable transactions; and 5) \$3,198 in purchases before award effective date. The findings are outlined in our report and presented by award in Appendix C. Additional information concerning the questioned items was provided separately by OIG to the Division of Institution and Award Support, Cost Analysis and Audit Resolution Branch.

Findings and Recommendations

Finding 1 – Exceeded NSF Limits on Senior Salary

Our review of the accounting and reporting of NSF senior salary costs revealed that Columbia does not adequately track/monitor senior personnel costs relative to the NSF two-month salary limit. Our review identified senior personnel whose salary exceeded the NSF two-month salary limit.

Per NSF grant terms and conditions, grantees are fully responsible for the adherence to NSF policies. One such condition relates to senior personnel. Per the NSF Award & Administration Guide (AAG), Chapter

V, Allowability of Cost, Section 1, Salaries, Wages, and Fringe Benefits, “NSF normally limits salary compensation for senior project personnel on awards made by the Foundation, to no more than two months of their regular salary in any one year. This limit includes salary received from all NSF funded grants...any compensation for such personnel in excess of two months must be disclosed in the proposal budget, justified in the budget justification, and must be specifically approved by NSF in the award notice.”

Using data analytics, we extracted employees appearing to exceed the two-month NSF senior salary limitation. We provided the list of potential salary overcharges to Columbia for review. Columbia’s Office of Research Policy & Indirect Costs, Office of the Controller identified and excluded employees: 1) exempt from the two-month limit; or 2) not senior personnel per the award documentation. Columbia also reviewed and corrected the salary rates as necessary. The final list of individuals confirmed by Columbia was examined, and the facts were verified with the award documentation and salary support (see Appendix D for detail by instance). After examining Columbia’s documentation, we identified questioned costs as follows:

Salary	Fringe Benefit	Overhead	Total Over
			\$ 774,976

The following schedule shows the breakout of questioned costs by the number of months in excess of the NSF senior salary policy (see Appendix C for detail by award).

Unallowable Months	Instances Over	Salary	Fringe Benefit	Overhead	Total Over
0 – 0.9	8		\$	\$	\$ 142,823
1 – 1.9	11				323,439
2 – 2.9	1				52,135
5 – 5.9	1				149,815
6 – 6.9	1				49,547
7 – 7.9	1				57,217
	23	\$			\$ 774,976

These overcharges were due to a lack of effective monitoring caused by an over-reliance on rebudgeting authority. As a result, \$774,976 in salary, fringe benefits and overhead on 34 NSF awards is questioned. Had Columbia effectively monitored its senior personnel salary costs, these overcharges would not have occurred. Without a process in place to ensure that senior personnel do not exceed the NSF two-month limit, there is the increased risk that funds may not be spent in accordance with NSF requirements.

Columbia claims to have relied on an informal November 2010 Frequently Asked Questions (FAQ) document on Proposal Preparation and Award Administration which states “NSF did not change the terms and conditions or any of our post-award prior approval requirements. Therefore, under the normal rebudgeting authority, an awardee could internally approve an increase of salary after an award is made. No prior approval by NSF is necessary.” However, the FAQ document is non-authoritative and contradicts the NSF requirement per the AAG which was in effect during the audit period. The FAQ simply states that awardees can increase salaries after an award is made. It did not waive the existing limit in the AAG; in fact, the FAQ states, “NSF has not changed the terms and conditions or any of our post-award prior approval requirements.” Therefore, we question the \$774,976 in overcharges that NSF did not approve.

Columbia's administrative and management controls were not adequately designed to facilitate monitoring of senior personnel salary limits which resulted in unallowable costs. Per Columbia, Researchers at the Lamont Observatory, including Lamont Research Professors, are appointed as Officers of Research by the University; they are not "faculty," who are appointed as Officers of Instruction. Columbia indicated that Officers of Research at Lamont do not receive a regular institutional salary from the University in the same manner as University faculty. Furthermore, salaries of Officers of Research are largely supported by sponsored research funds, rather than by the general university funds that support salaries for Officers of Instruction. As a result, Columbia continued it is common practice for Lamont researchers to charge a substantial portion of their salaries to grants, including NSF grants. Columbia contended they are cognizant of NSF's guidance regarding the charging to NSF awards of salaries in excess of two months for Officers of Instruction, and as a result, in instances where proposals include senior staff who hold an appointment of Lamont Research Professor, a justification clarifying that such senior staff are not Officers of Instruction is included in the proposal, together with their salary detail. Upon receipt of the NSF Notice of Award, including the approved budget, Columbia stated they consider the senior salary charges approved by NSF. Columbia believes they have complied with the applicable NSF guidance and received award approval based on the proposed budget. Columbia further indicated senior salary charges are applied to the awards in accordance with the budget, which often results in more than two months' salary being charged to NSF grants.

Per the Grant Proposal Guide (GPG) Exhibit II-7, senior personnel, defined by NSF as Principal Investigators (PIs), Co-PIs, or faculty, are jointly responsible for the direction of the project. These individuals, identified by Columbia on the award budget, are the senior personnel responsible for the project and subject to the two-month salary limit. NSF's Award and Administration Guide states, "Any compensation for such personnel in excess of two months must be disclosed in the proposal budget, justified in the budget justification, and must be specifically approved by NSF in the award notice". The questioned salary charges for the individuals included in this finding exceeded the months approved by NSF.

Recommendation 1:

We recommend that the NSF's Director of the Division of Institution and Award Support (DIAS) address and resolve the following Columbia recommendations:

- a. Work with NSF to resolve the \$774,976 of questioned costs; and
- b. Strengthen the administrative and management controls and processes for senior personnel to ensure NSF salary limits are not exceeded.

Summary of Awardee Response:

Columbia does not agree with this finding. The University has determined that the senior salary costs in question were allowable and properly allocated to the grants in question in accordance with NSF policy. The majority of the costs questioned relate to researchers who are appointed as Officers of Research by the University; they are not "faculty," who Columbia appoints as Officers of Instruction. Salaries of Officers of Research are largely supported by sponsored research funds, rather than by the general University funds that support salaries for Officers of Instruction. As a result, they are not equivalent to the fully University supported, 9-month faculty principal investigators (PIs) who appear to be the intended subjects of the 2-month salary limitation. Moreover, salary in excess of the two month limitation is budgeted, justified and approved by NSF via incorporation of the budget in the applicable award notification, in accordance with NSF policy. Columbia has complied with NSF policy as published in its 2009 Proposal and Award Policies and Procedures Guide (PAPPG). A significant portion of the

remaining questioned costs result from re-budgeting of senior personnel salaries. Columbia has relied on the guidance provided by NSF regarding the ability of institutions to rebudget senior salaries after the award is made. NSF clarified its policy in the 2010 FAQ. In addition, consistent with Columbia's understanding of NSF policy, we have noted that NSF appears to have supported positions similar to Columbia's by other major research with regard to the application of the NSF policy for senior salary charges.

See Appendix A for the complete Columbia response.

Auditor Comments:

Although Columbia contends they received approval to exceed the salary limit through the budget proposal process, the questioned costs in this finding relate to instances where the salary months exceeded what was approved by NSF. Columbia agreed that these individuals' salaries exceeded the NSF approved salary limit, however, their reliance on rebudgeting authority resulted in questioned costs based on the official NSF policy applicable during the audit period. Columbia interpreted the November 2010 FAQ on Proposal Preparation and Award Administration which states, NSF has not "changed the terms and conditions or any of our post-award prior approval requirements. Therefore, under the normal rebudgeting authority, an awardee can internally approve an increase of salary after an award is made," to mean the two-month salary limit on senior personnel could be disregarded post award. The FAQ made no mention of the ability to disregard or violate the NSF AAG. Furthermore, informal communication in a FAQ does not supersede the official policy per the AAG. Therefore, the report finding remains as previously stated.

Finding 2 – Unreasonable Equipment, Materials and Supplies Charges

We found that equipment, materials, and supply expenses totaling \$343,794 charged to 13 NSF awards were not necessary or reasonable in accordance with 2 CFR 220 (OMB Circular A-21).

According to 2 CFR 220, Appendix A, Section C, to be allowable for a federal grant, a cost must be allocable to the federal award and be necessary and reasonable for the administration and performance of the award. Furthermore, Section C.3 provides that a reasonable cost is one that a "prudent person" would have incurred under similar circumstances.

2 CFR 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.... The recipient institution is responsible for ensuring that costs charged to a sponsored agreement are allowable, allocable, and reasonable under these cost principles." Section A states "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."

Equipment and Materials Purchases at End of Award

We questioned \$222,774 on eight awards for equipment purchased near the award expiration that did not appear to benefit the award or that did not appear reasonable or prudent considering the limited time remaining on the awards.

- \$75,788 for the purchase of equipment used to examine the [REDACTED] [REDACTED] Per Columbia, personnel made transitions faster than expected which enabled them to purchase equipment they considered to be allowable under the terms agreed to for federal

demonstration project participants. The installation was completed with the aim of finalizing project research. However, this equipment, purchased June 30, 2011 on a nine-year award that expired August 31, 2011, was only available for 2 percent of the NSF grant life (62 out of 3,285 days);

- \$40,000 for the purchase of equipment (\$16,000 for a [REDACTED] on March 23, 2010 and \$24,000 for the purchase of a [REDACTED] on May 25, 2010, on a three-year award that expired on July 31, 2010. The equipment budget was zero in the original and revised NSF award budgets. Between the two purchases, 13 percent of the total NSF award budget was spent on unplanned equipment with less than 6 months remaining on the award. The [REDACTED] was available for only 12 percent of the NSF grant life (130 out of 1,080 days) and the [REDACTED] was available for only 6 percent of the NSF grant life (67 out of 1,080 days). Columbia did not provide adequate evidence that the purchases provided benefit to the award. Therefore, the charges do not appear reasonable;
- \$35,000 for the purchase of a [REDACTED]. Two [REDACTED] costing \$70,000 were purchased three months before the NSF award expiration. The questioned unit was purchased as an active spare in case of unit failure, but was never used for this NSF award. The unused [REDACTED], purchased on December 31, 2011, on a four-year award that expired March 31, 2012, was not necessary for the performance of this NSF award;
- \$20,566 for the purchase of various parts. The parts, shipped on October 1, 2010 after the NSF award expired on September 30, 2010, were not received until after award expiration and therefore could not have benefitted this NSF award;
- \$17,788 for the purchase of a laser. Columbia stated that the purchase benefited the project because a loaner laser, which is the same as the one eventually purchased, was used on the project during 2011. However, the purchase made in December 2011 was not received until May 2012, five months after the NSF award expiration on December 31, 2011;
- \$14,427 for the purchase of [REDACTED]. Columbia purchased 28 [REDACTED] costing \$25,330 and charged 36 percent of the total cost to the NSF award. No explanation for the allocation methodology used was provided. Furthermore, the equipment delivered on February 22, 2010 for an award that expired February 28, 2010 was available for one percent of the NSF grant life (6 out of 546 days). Columbia agreed that this expenditure was unreasonable and will reverse the charge;
- \$13,501 for the purchase of additional disk storage and a work station. Per Columbia, the additional disk storage for the computer cluster, and workstation enabled efficient pre-processing of some of the data and continued to be used past the NSF award expiration for similar purposes. However, the storage purchased on June 6, 2012 and the work station purchased on June 13, 2012 on a three-year award that expired on June 30, 2012 were available for less than two percent of the grant life (24 out of 1,095 days); and
- \$5,704 for the purchase of a computer. Per Columbia, a laboratory computer was necessary to carry out the NSF award, because 1) the award is specifically and solely for computation; 2) the need to connect continuously from the laboratory to NSF-supported supercomputer sites; 3) the old computer was becoming progressively less effective at carrying out high-speed data transfers; and 4) the computer support contract was expiring. However, the computer, purchased on May 3, 2013, on a four-year award that expired on July 31, 2013 was only available for 6 percent of the NSF grant life (89 out of 1,460 days).

Equipment Allocations

We questioned \$70,320 for equipment purchased by one PI and charged to three awards with equipment budgets of zero. For each transaction, the PI stated the equipment was not used exclusively by the NSF award to which the purchase was charged, but by multiple awards. Specifically, we question:

- \$30,700 for the purchase of [REDACTED] and a [REDACTED]. Per Columbia, the equipment was necessary to produce measurements for this NSF award. However, per Columbia, the equipment was not used exclusively on this award. Additionally, the NSF award had no equipment budget, nine percent of the budget was used to purchase this equipment, and the purchase was made during the first 100 days of this three year award. Columbia agreed that this expenditure was unreasonable and will reverse the charge;
- \$29,620 for the purchase of an [REDACTED] (\$10,495), [REDACTED] (\$9,100), and a [REDACTED] (\$10,025) within the first six months of the award. The original NSF award budget for equipment, materials and supplies was reduced due to a NSF requested funding reduction. We are not questioning the rebudgeting authority of Columbia. We are questioning whether it was reasonable or prudent for the awardee to purchase equipment in the first six months of the award. The equipment was not used exclusively on this award and the revised budget significantly reduced the equipment, materials and supplies budget keeping most of the original budget for the graduate students intact. Columbia agreed that this expenditure was unreasonable and will reverse the charge; and
- \$10,000 for partial payment of a laser system repair. The invoice totaling \$56,667 showed an amount due of \$16,667. Columbia stated that there was no allocation; however, only \$10,000 of the \$16,667 was charged to this NSF award. An explanation of where the previously invoiced amount of \$40,000 and the remaining \$6,667 was charged was requested but never received. Additionally, the original NSF award equipment budget was zero and the materials and supplies budget was reduced by 66 percent due to the NSF requested funding reductions. The reduction was to be supplemented by other internal sources. We are not questioning the rebudgeting authority of Columbia, we are questioning whether it was reasonable or prudent for the awardee to claim the equipment charges on this award when the equipment was not used exclusively on this award, there was an equipment budget of zero, the materials and supplies budget was reduced, and an adequate explanation for the allocation has not been provided. Columbia agreed that this expenditure was unreasonable and will reverse the charge.

We questioned \$31,491 for purchases of infrared camera equipment that did not benefit the NSF award. Per the documentation provided for audit, the items were not approved for this NSF project and were to be transferred to the PI's institutional account. Columbia discovered the error when providing the audit documentation and has taken corrective action to remove the charges.

We questioned \$19,209 for the purchase of coupling parts for lab equipment. The parts were not used exclusively on this NSF award. Per Columbia, the PI used the system solely on this NSF award in Year 1 of the two year project (October 1, 2009 through September 30, 2011). Subsequently, the PI was able to use the system for three other projects. The cost of the equipment should have been allocated across the four projects; however, Columbia was unable to reallocate the purchase. Columbia agreed that this expenditure was unreasonable and will reverse the charge.

Columbia personnel did not adequately review the propriety of these expenditures charged to NSF awards which resulted in unreasonable costs. Without an effective process in place to ensure the reasonableness of equipment, materials, and supplies expenses, there is the increased risk that funds may not be used as required to accomplish the necessary project objectives in accordance with federal and NSF requirements. Columbia indicated that it has performed corrective actions to remove \$135,447 in unreasonable costs from the awards in question leaving \$208,347 remaining unresolved. NSF, during the audit resolution process, should ensure that the awards were credited as appropriate.

Recommendation 2:

We recommend that the NSF's Director of the DIAS address and resolve the following Columbia recommendations:

- a. Work with NSF to resolve the \$343,794 of questioned costs; and
- b. Strengthen the administrative and management controls and processes for reviewing and approving equipment, materials and supplies charged to NSF awards.

Summary of Awardee Response:

Columbia agrees with the conclusion for \$135,447 of the questioned costs and has removed these costs from the respective awards. Columbia disagrees with the conclusion for the remaining \$208,347 of the questioned costs. According to Columbia:

- The \$75,788 equipment purchase was made at the time the researcher needed to obtain final results. The equipment helped with conducting the final research/analysis of the project;
- \$40,000 for the purchase of the compressor and bit-rate multiplier could only be utilized once the equipment had been fabricated and all the data related to the project had been collected, completed, and verified;
- \$35,000 for the second unit was triggered by the need for an active spare as requested in the original proposal;
- \$20,566 core purchase had an invoicing problem which delayed delivery and continues to be utilized on subsequent awards;
- \$17,788 laser was not available from the vendor and was not expected to be available for an extended period of time. The PI was able to negotiate for the use of a loaner laser with the condition that the \$17,788 laser would be purchased when it became available. When the laser became available in December 2011, the PI placed the purchase order immediately, received the laser, and returned the loaner;
- \$13,501 equipment purchase was purchased shortly before the end date of the award was used following the expiration of the award (and continues to be used on NSF awards to this day) to do research proposed for under the proposal/award; and
- The \$5,704 for the purchase of a laboratory computer was necessary to carry out the award. As the existing computer supporting the necessary computations was becoming progressively less effective and its support contract was expiring it was determined that a new computer was needed to support the project. Considerable progress was made during the final 89 days of the grant as a result of this purchase.

See Appendix A for the complete Columbia response.

Auditor Comments:

Columbia's comment related to the \$135,447 is responsive to the issue noted in this finding. Once NSF determines that the recommendation has been adequately addressed and the \$135,447 in questioned costs has been returned, this issue should be closed.

The University does not concur with the remaining questioned costs totaling \$208,347. Although the purchases of the \$75,788 [REDACTED] \$16,000 [REDACTED] \$24,000 [REDACTED] \$20,566 parts, \$13,501 additional storage and work station, and \$5,704 computer may have benefitted the research efforts, given the limited time remaining on the NSF awards that benefit is greater for future research projects. Therefore, the report finding related to these matters remains as previously stated.

The \$35,000 for the [REDACTED] and \$17,788 laser were not used during the award periods. Therefore, the report finding remains as previously stated.

Finding 3 – Unsupportable and Unallocable Transactions

We found \$31,382 of unallocable transactions related to three awards which were not in accordance with 2 CFR 220, Appendix A, Section C.4 which states 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...The recipient institution is responsible for ensuring that costs charged to a sponsored agreement are allowable, allocable, and reasonable under these cost principles.” Additionally, Section A states “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.”

- \$16,124 for the purchase of a camera system that should not have been charged to the NSF award. Columbia discovered the error when providing audit documentation and indicated that it has taken corrective action to remove the charges;
- \$8,818 for housing costs. Adequate documentation was not provided to support the charges. The invoice from the Office of Residential Services | [REDACTED] College, shows the rental of 20 rooms, for various dates, with a total cost of \$16,400. Columbia stated that the housing costs were initially charged to another grant in May 2011 as part of the bulk reservation and then expenses were moved to this NSF award via a journal voucher in June 2011. The journal voucher was not provided as support and the methodology for the allocation of expenses to this NSF award was not supported. Additionally, this NSF award expired in June 2011, the month the expenses were transferred to the award and Columbia's explanation of benefit to the award appears to be in reference to a different transaction; and
- \$6,440 for lecturer fees due to Columbia not being able to provide an invoice. Columbia did not provide adequate documentation for the transaction. Columbia agreed that this expenditure is unreasonable and will reverse the charge.

Columbia personnel did not adequately review the expenditures charged to the NSF awards which resulted in unsupportable and unallocable costs. Without an effective process in place to ensure costs are supported and allocable to the award, there is the increased risk that funds may not be used as required to accomplish the necessary project objectives in accordance with federal and NSF requirements. Columbia indicated that it has performed corrective actions to remove \$22,564 in unsupported costs from the awards in question leaving \$8,818 remaining unresolved. NSF, during the audit resolution process, should ensure that the awards have been credited as appropriate.

Recommendation 3:

We recommend that the NSF's Director of the DIAS address and resolve the following Columbia recommendations:

- a. Work with NSF to resolve the \$31,382 of questioned costs; and
- b. Strengthen the administrative and management controls and processes for reviewing and approving transactions charged to NSF awards.

Summary of Awardee Response:

Columbia agrees with the conclusion for \$22,564 of the questioned costs and has removed these costs from the respective awards. Columbia disagrees with the conclusion for \$8,818 of the questioned costs and has concluded that these were reasonable expenditures and allowable and allocable to the award. The housing costs were initially charged to another NSF award [REDACTED] in May 2011 as part of the bulk reservation for administrative convenience. Once the information was available to appropriately allocate the charges, they were allocated between the grants as shown in the supporting documents.

See Appendix A for the complete Columbia response.

Auditor Comments:

Columbia's comment related to the \$22,564 is responsive to the issue noted in this finding. Once NSF determines that the recommendation has been adequately addressed and the \$22,564 in questioned costs has been returned, this issue should be closed.

Adequate documentation was not provided to support the \$8,818 for housing costs or the allocation methodology. Additionally, this NSF award expired in June 2011, the month the expenses were transferred to the award and the explanation provided appears to be in reference to a different transaction. Therefore, the report finding related to this matter remains as previously stated.

Finding 4 – Unreasonable or Unallowable Transactions

We found \$25,991 charged to five awards for unreasonable or unallowable expenses which were not in accordance with 2 CFR 220 and 5 U.S.C. 5707.

According to 2 CFR 220, Appendix A, Section C, to be allowable for a federal grant, a cost must be allocable to the federal award and be necessary and reasonable for the administration and performance of the award. Furthermore, Section C.3 provides that a reasonable cost is one that a "prudent person" would have incurred under similar circumstances. In addition, 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.... The recipient institution is responsible for ensuring that costs charged to a sponsored agreement are allowable, allocable, and reasonable under these cost principles." Also, per Section J.3, the costs of alcoholic beverages are unallowable.

5 U.S.C. 5707, Subpart A, §301-11.1 states that an allowance (per diem or actual expense) is only proper when employees perform official travel away from their official station.

During our audit we noted the following unreasonable or unallowable charges:

- \$12,624 for the cost of rental accommodations for a PI in [REDACTED] while on a research sabbatical from July to December 2010. The PI gave up his [REDACTED] apartment during the sabbatical and charged NSF for an apartment in [REDACTED]. Payment for travel accommodation is allowable only when traveling away from an employee's official duty station, and therefore, it is not reasonable to charge the award for basic living accommodations in [REDACTED]. This is the same award we questioned \$11,583 for travel charged after award expiration (see Finding 5). Columbia agreed that this expenditure was unreasonable and will reverse the charge;

- \$8,050 for an honorarium (\$5,000 plus related indirect costs of \$3,050). Originally, Columbia stated that this expense was honorarium for a guest speaker at a conference dinner. Columbia provided a check request for the \$5,000 honorarium and a conference agenda. However, the conference agenda did not include this individual's name as a speaker. Subsequently, Columbia stated that the individual served as an expert and a contributor toward the NSF award and that the \$5,000 was necessary to cover part of his research efforts, expert opinions, books, journals and computational expenses. No formal consulting arrangement or deliverables were provided by Columbia to support their subsequent explanation. Therefore, we are unable to conclude what services, if any, were actually provided by this individual, how the services benefitted the award, and whether the services were reasonable and necessary. Columbia agreed that this expenditure was unreasonable and will reverse the charge;
- \$1,807 for human subject payments charged to a NSF award in error. Columbia discovered the error when providing the audit documentation and has taken corrective action to remove the charges;
- \$1,347 for excess costs of hosting a dinner. Columbia charged to one NSF award \$2,683 in costs for hosting a dinner for 40 guests, however, only 25 guests were actually present. We question \$1,028, the amount exceeding the cost of hosting the dinner for 25 guests, plus related indirect costs of \$319, since these excess costs were not reasonable or prudent. Columbia agreed and has taken corrective actions to remove the excess costs;
- \$1,224 in unreasonable travel expenses for a PI to attend a conference in [REDACTED] Columbia agreed that this expenditure is unreasonable and will reverse the charges:
 1. \$793 for a car rental and gas. The PI procured a rental car from [REDACTED] but was missing the receipt. The PI's bank statement was provided showing the charge from [REDACTED] but without the rental car receipt we were unable to determine the actual dates the car was rented. As the PI and his wife stayed in [REDACTED] until July 21, when the conference ended July 15, we cannot determine if the rental car was only rented for use during the conference. We are also questioning the cost of gas for the rental car.
 2. \$201 for the cost of meals charged to the award for an additional person other than the PI. The PI made notes on multiple food receipts that he was paying for an employee of UC-Riverside. The PI said the meals were business dinners/lunches, however, we do not know what the UC-Riverside employee submitted to her University for reimbursement and we have no way of identifying if the PI was actually paying for the UC-Riverside employee and not his wife.
 3. \$176 for the cost of airfare and hotel accommodations, including associated indirect costs, for which the PI overcharged the award based on the currency conversion. The PI exchanged \$1,000 US currency in order to pay back the individuals who made the airfare and hotel accommodations. The total direct cost of these accommodations, based on receipts, was \$842;
 4. \$54 for the cost of meals charged to the award for which the PI did not have receipts as required by Columbia policy.
- \$755 for the Portland portion of a multi-leg flight for a research presentation at a conference not directly related to the award, which would, therefore, be unallowable. Columbia initially indicated that the Portland portion of the flight was chargeable to a departmental account. They subsequently revised their position and stated that the entire flight should be charged to this award;
- \$167 for same-day flight change fees. These charges were not necessary and did not benefit the award; and
- \$17 for the purchase of alcohol with dinner. Columbia agreed that this expenditure was unallowable and will reverse the charge.

Columbia personnel did not adequately review the expenditures charged to NSF awards which resulted in these unreasonable or unallowable transactions. Without an effective process in place to ensure the proper monitoring of award expenditures, there is the increased risk that funds may not be spent in accordance with Federal requirements. Columbia indicated that it has performed corrective actions to remove \$25,069 in unreasonable and unallowable costs from the awards in question leaving \$922 remaining unresolved. NSF, during the audit resolution process, should ensure that the awards have been credited as appropriate.

Recommendation 4:

We recommend that the NSF's Director of the DIAS address and resolve the following Columbia recommendations:

- a. Work with NSF to resolve the \$25,991 of questioned costs; and
- b. Strengthen the administrative and management controls and processes for reviewing and approving unallowable costs including travel and meetings costs charged to NSF awards.

Summary of Awardee Response:

Columbia agrees with the conclusion for \$25,069 of the questioned costs and has removed these costs from the respective awards. Columbia disagrees with the conclusion for \$922, \$755 for the airfare and \$167 in flight change fees. Columbia has concluded that, after further review and discussion, these were reasonable expenditures and allowable and allocable to the award. Participation at the conference increased the broader impact of the project and the flight change was necessary to ensure the students' timely return to classes.

See Appendix A for the complete Columbia response.

Auditor Comments:

Columbia's comment related to the \$25,069 is responsive to the issue noted in this finding. Once NSF determines that the recommendation has been adequately addressed and the \$25,069 in questioned costs has been returned, this issue should be closed.

The remaining \$922 for airfare and flight change fees did not benefit the awards and were not reasonable or necessary. According to 2 CFR 220, Appendix A, Section C, to be allowable for a federal grant, a cost must be necessary and reasonable for the administration and performance of the award. Therefore, the report finding related to these matters remains as previously stated.

Finding 5 – Transactions after Award Expiration

We questioned \$22,414 charged to three awards for travel and equipment purchased after award expiration that was not in accordance with 2 CFR 220 and NSF guidance.

According to 2 CFR 220, Appendix A, Section C, to be allowable for a federal grant, a cost must be allocable to the federal award and be necessary and reasonable for the administration and performance of the award. In addition, per the NSF AAG, Chapter V, Allowability of Cost, Section A, Basic Considerations, "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."

We questioned \$11,583 charged to one NSF award after award expiration:

- \$8,481 for lodging expenses that occurred after award expiration. Lodging expenses for the PI in [REDACTED] for the months of July, August and September 2011 were charged to an award that expired on June 30, 2011. Columbia agreed and has taken corrective actions to remove the charge;
- \$1,457 for travel that occurred after award expiration. Airfare for the PI was purchased from [REDACTED] to Newark, NJ departing September 19, 2011 on an award that expired on June 30, 2011. Columbia agreed and has taken corrective actions to remove the charge;
- \$824 for lodging expenses that occurred after award expiration. Lodging expenses in New York for the PI for five nights, September 14-19, 2011, were charged to an award that expired on June 30, 2011. Columbia agreed and has taken corrective actions to remove the charge; and
- \$821 for lodging expenses that occurred after award expiration. Lodging expenses in New York for the PI for two nights, September 23-24, 2011, were charged to an award that expired on June 30, 2011. Columbia agreed and has taken corrective actions to remove the charge.

We questioned an additional \$10,831 charged to two NSF awards after award expiration:

- \$7,287 for the purchase of equipment after award expiration. The equipment was purchased on January 6, 2012 on an award that expired on December 31, 2011. Columbia agreed and has taken corrective actions to remove the charge; and
- \$3,544 for the purchase of a computer after award expiration. The computer was purchased on September 8, 2011 on an award that expired on August 31, 2011. Columbia agreed and has taken corrective actions to remove the charge.

Columbia personnel did not adequately review the expenditures charged to NSF awards which resulted in charges after the award expiration. Without an effective process in place to ensure the proper monitoring of purchases near or after the award expiration, there is the increased risk that funds may not be spent in accordance with Federal requirements. Columbia indicated that it has performed corrective actions to remove the \$22,414 in expenditures after the award expiration. NSF, during the audit resolution process, should ensure that the awards have been credited as appropriate.

Recommendation 5:

We recommend that the NSF's Director of the DIAS address and resolve the following Columbia recommendations:

- a. Work with NSF to resolve the \$22,414 of questioned costs; and
- b. Strengthen the administrative and management controls and processes for reviewing expenses occurring near or after award expiration.

Summary of Awardee Response:

Columbia agrees with the conclusion for \$22,414 of questioned costs and has removed these costs from the respective awards. See Appendix A for the complete Columbia response.

Auditor Comments:

Columbia's comment related to the \$22,414 is responsive to the issue noted in this finding. Once NSF determines that the recommendation has been adequately addressed and the \$22,414 in questioned costs has been returned, this issue should be closed.

Finding 6– Purchases before Award Effective Date

We questioned \$3,198 charged to one NSF award for purchases more than 90 days prior to the award effective date without NSF approval.

Per the NSF AAG, Chapter V, Section 2.b, Pre-Award Costs, “(i) Grantees may incur allowable pre-award costs within the 90 day period immediately preceding the effective date of the grant providing: (a) the approval of pre-award spending is made and documented in accordance with the grantee’s procedures; and (b) the advanced funding is necessary for the effective and economical conduct of the project. (ii) Pre-award expenditures are made at the grantee’s risk. Grantee authority to approve pre-award costs does not impose an obligation on NSF: (1) in the absence of appropriations; (2) if an award is not subsequently made; or (3) if an award is made for a lesser amount than the grantee anticipated. (iii) Requests for pre-award costs for periods exceeding 90 days must be submitted electronically via use of the Notification and Request module in FastLane. Pre-award expenditures prior to funding of an increment within a continuing grant are not subject to this limitation or approval requirement, but are subject to paragraph (ii) above.”

We are questioning pre-award costs related to one NSF award for the \$3,198 purchase of a MacBook Pro on March 12, 2011 on an award that did not begin until July 1, 2011. The purchase took place more than 90 days before the award effective date without NSF approval; and therefore, the costs are questioned.

The established internal controls were not adequate to prevent the pre-award costs from being charged to the awards, to identify the errors before the final report, or to guarantee the requests to exceed the 90 day period were submitted to NSF. As a result of inadequate internal controls pre-award costs were charged to the NSF awards in violation of NSF’s policies. Without adequate controls to ensure costs charged more than 90 days prior to the award expiration have been approved by NSF, there is the increased risk that funds may not be used as required to accomplish the necessary project objectives in accordance with federal and NSF requirements.

Recommendation 6:

We recommend that the NSF’s Director of the DIAS address and resolve the following Columbia recommendations:

- a. Work with NSF to resolve the \$3,198 of questioned costs; and
- b. Strengthen the administrative and management controls and processes to ensure that charges occurring more than 90 days prior to the award effective date are not charged to an award without NSF approval.

Summary of Awardee Response:

Columbia disagrees with the conclusion for \$3,198 of the questioned costs. The PI’s computer ceased working requiring him to immediately purchase another costing \$3,198. Columbia’s response also included adequate support for additional questioned costs which we have removed from this finding.

See Appendix A for the complete Columbia response.

Auditor Comments:

The University does not concur with the \$3,198 laptop purchase more than 90 days prior to the award effective date without NSF approval. According to the NSF AAG, grantees may incur allowable pre-

award costs provided that requests for periods exceeding 90 days are submitted electronically to NSF. No such request has been provided, therefore, the report finding related to this matter remains as previously stated.

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

WithumSmith+Brown, PC
June 21, 2016

APPENDICES

AWARDEE RESPONSE

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK
OFFICE OF THE CONTROLLER

June 21, 2016

WithumSmith+Brown
Two Logan Square, Suite 2001
Eighteenth and Arch Streets
Philadelphia, PA 19103-2726

RE: Response to the WithumSmith+Brown Draft Audit Report of Columbia University for the National Science Foundation (NSF) Office of Inspector General (OIG)

Dear Sir or Madam:

Columbia University (Columbia) has reviewed your draft audit report entitled "Audit of Incurred Costs for National Science Foundation Awards For the Period April 1, 2010 to March 31, 2013" and as requested, provides the following comments in response to this draft report.

FINDING 1 – EXCEEDED NSF LIMITS ON SENIOR SALARY

Columbia does not agree with the findings as presented by WithumSmith+Brown. The University has determined that the senior salary costs in question were allowable and properly allocated to the grants in question in accordance with NSF policy. The University has provided WithumSmith+Brown with additional support for the questioned costs noting that a significant portion of the questioned costs related to instances where approved budgets included senior salary amounts in excess of the two month limitation and where personnel do not meet the criteria assumed for Senior Personnel.

The majority of the costs questioned relate to researchers at Columbia who are appointed as Officers of Research by the University; they are not "faculty," who Columbia appoints as Officers of Instruction. Officers of Research are not eligible for tenure and do not receive a regular institutional salary from the University in the same manner as University Officers of Instruction. Salaries of Officers of Research are largely supported by sponsored research funds, rather than by the general University funds that support salaries for Officers of Instruction. As a result, they are not equivalent to the fully University supported, 9-month faculty principal investigators (PIs) who appear to be the intended subjects of the 2-month salary limitation. Moreover, salary in excess of the two month limitation is budgeted, justified and approved by NSF via incorporation of the budget in the applicable award notification, in accordance with NSF policy. NSF funds do not augment the total salary or salary rate of faculty members during the period covered by the term of appointment. Columbia has complied with NSF policy as published in its 2009 Proposal and Award Policies and Procedures Guide (PAPPG). Chapter II.C.2g (http://www.nsf.gov/pubs/policydocs/pappguide/nsf09_29/gpg_2.jsp#IIIC2g) states:

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NSF regards research as one of the normal functions of faculty members at institutions of higher education. Compensation for time normally spent on research within the term of appointment is deemed to be included within the faculty member's regular organizational salary.

As a general policy, NSF limits salary compensation for senior project personnel to no more than two months of their regular salary in any one year. This limit includes salary compensation received from all NSF-funded grants. This effort must be documented in accordance with the applicable cost principles. If anticipated, any compensation for such personnel in excess of two months must be disclosed in the proposal budget, justified in the budget justification, and must be specifically approved by NSF in the award notice.

A significant portion of the remaining questioned costs result from re-budgeting of senior personnel salaries. Columbia has relied on the guidance provided by NSF regarding the ability of institutions to re-budget senior salaries after the award is made. NSF clarified its policy in the following 2010 FAQ (http://www.nsf.gov/pubs/policydocs/pappguide/faqs11_1.pdf):

Must awardees request prior NSF approval if making a change post-award to the amount originally budgeted for senior personnel salary?

NSF has not changed the terms and conditions or any of our post-award prior approval requirements. Therefore, under the normal rebudgeting authority, an awardee can internally approve an increase of salary after an award is made. No prior approval from NSF is necessary. The caveat is if the change would cause the objective or scope of the project to change, then the awardee would have to submit an approval request via FastLane. Since salary can amount to a large part of the budget, there may very well be a scope change with addition of salary, especially if, for example, the PI decided not to hire a grad student in order to have enough money to cover the salary increase.

This guidance was formalized in Chapter II.C.2g of the 2015 NSF PAPPG which went into effect December 26, 2014 (http://www.nsf.gov/pubs/policydocs/pappguide/nsf15001/nsf15_1.pdf):

NSF regards research as one of the normal functions of faculty members at institutions of higher education. Compensation for time normally spent on research within the term of appointment is deemed to be included within the faculty member's regular organizational salary. As a general policy, NSF limits the salary compensation requested in the proposal budget for senior personnel to no more than two months of their regular salary in any one year. This limit includes salary compensation received from all NSF-funded grants. This effort must be documented in accordance with 2 CFR § 200, Subpart E. If anticipated, any compensation for such personnel in excess of two months must be disclosed in the proposal budget, justified in the budget justification, and must be specifically approved by NSF in the award notice budget.²¹ Under normal re-budgeting authority, as described in AAG Chapters II and V, an awardee can internally approve an increase or decrease in person months devoted to the project after an award is made, even if doing so results in salary support for senior personnel exceeding the two month salary policy. (emphasis added) No prior approval from NSF is necessary as long as

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that change would not cause the objective or scope of the project to change. NSF prior approval is necessary if the objective or scope of the project changes.

In addition, consistent with Columbia's understanding of NSF policy, we have noted that NSF appears to have supported positions similar to Columbia's by other major research institutions including Michigan State University, University of California, Santa Barbara, University of California, Los Angeles, University of Florida and Virginia Polytechnic Institute and State University with regard to the application of the NSF policy for senior salary charges.

Columbia disagrees with the conclusion for \$774,976 of questions costs related to senior salary charges. Columbia believes it has complied with and continues to be in compliance with NSF policies regarding senior personnel salary limitations. Columbia will work with the Cost Analysis & Audit Resolution Branch within the Division of Institution and Award Support of the NSF to determine if any adjustments to amounts charged to the respective awards are necessary and if any enhancements to its administrative and management controls are needed.

FINDING 2 – UNREASONABLE EQUIPMENT, MATERIALS AND SUPPLIES CHARGES

WithumSmith+Brown questioned costs of \$343,794 of which Columbia agrees with the conclusion for \$135,447 of the questioned costs and has removed these costs from the respective awards. Columbia disagrees with the conclusion for \$208,347 of the questioned costs and will work with the Cost Analysis & Audit Resolution Branch within the Division of Institution and Award Support of the NSF to determine if any inappropriate costs have been claimed. Columbia has provided all relevant documents related to these expenditures to WithumSmith+Brown during the course of the audit.

Below please find a detailed response to each finding identified by WithumSmith+Brown with which Columbia disagrees.

WithumSmith+Brown questioned \$75,788 for the purchase of equipment

*\$75,788 for the purchase of equipment used to examine the [REDACTED]
 [REDACTED] Per CU, personnel made transitions faster than expected which enabled them to purchase equipment under the federal demonstration project. The installation was completed with the aim of finalizing project research. However, this equipment, purchased June 30, 2011 on a nine-year award that expired August 31, 2011, was only available for 2 percent of the NSF grant life (62 out of 3,285 days)*

Columbia Response:

Columbia disagrees with the WithumSmith+Brown conclusion. Columbia has concluded that the equipment purchase was a reasonable expenditure and allowable and allocable to the award as the new equipment was needed to examine the [REDACTED] which only became clear in the latter part of the research.

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The purchase was made at the time the researcher needed to obtain final results in the areas of [REDACTED]
 [REDACTED] for subsequent detection; [REDACTED]

[REDACTED] part of the [REDACTED]
 The equipment benefited the project in that it helped with conducting the final research/analysis of the project.

WithumSmith+Brown questioned \$40,000 for the purchase of equipment, \$16,000 for a [REDACTED]
 [REDACTED] in March 23, 2010 and \$24,000 for the purchase of a [REDACTED]

\$40,000 for the purchase of equipment - \$16,000 for a [REDACTED] on March 23, 2010 and \$24,000 for the purchase of a [REDACTED] on May 25, 2010, on a three-year award that expired on July 31, 2010. The equipment budget was zero in the original and revised NSF award budgets. Between the two purchases, 13 percent of the total NSF award budget was spent on unplanned equipment with less than 6 months remaining on the award. The compressor was available for only 12 percent of the NSF grant life (130 out of 1,080 days) and the [REDACTED] was available for only 6 percent of the NSF grant life (67 out of 1,080 days). CU did not provide adequate evidence that the purchases provided benefit to the award. Therefore, the charges do not appear reasonable

Columbia Response:

Columbia disagrees with the WithumSmith+Brown conclusion. Columbia has concluded that the equipment purchase was a reasonable expenditure and allowable and allocable to the award. Columbia adhered to the National Science Foundation budgeting guidelines and institutional policy with regard to this equipment purchase. Columbia has previously provided, as supporting documentation, an email acknowledging that the re-budgeting request was approved and forwarded for final processing. The equipment purchased was utilized to directly enhance the goals of the grant. Due to the nature of the research the equipment could only be utilized once all data related to the entire project (which included several photonic devices) was collected, completed, and verified and equipment fabricated by the Co-PI. Upon completion of these tasks, the questioned equipment was utilized by the PI to perform the necessary system level high-speed measurements.

WithumSmith+Brown questioned \$35,000 for the purchase of a [REDACTED]

\$35,000 for the purchase of a [REDACTED] Two [REDACTED] costing \$70,000 were purchased three months before the NSF award expiration. The questioned unit was purchased as an active spare in case of unit failure, but was never used for this NSF award. The unused [REDACTED], purchased on December 31, 2011, on a four-year award that expired March 31, 2012, was not necessary for the performance of this NSF award

Columbia Response:

Columbia disagrees with the WithumSmith+Brown conclusion. Columbia has concluded that the

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equipment purchase was a reasonable expenditure and allowable and allocable to the award. The decision to procure two units instead of one, as requested in the original proposal, was triggered by the need for an active spare. The need for an active spare was only determined after sufficient experience with these cryocoolers demonstrated a failure rate which was not known at the time of the proposal. The [REDACTED] experiment was designed to use the specific [REDACTED] to liquefy and maintain the [REDACTED] temperature over time. Adapting a different type of cold head to the [REDACTED] would require the redesign of a large part of the apparatus. Because the [REDACTED] is essential equipment for the experiment, it was prudent and reasonable to procure a spare unit, in case of a failure of any of the components of a [REDACTED] in the assembly. As a [REDACTED] is itself a complicated instrument, and must be installed and interfaced with the existing [REDACTED] certain risks cannot be avoided and are not mitigated by virtue of the unit being new. Damage or failure of the many components of this system is possible during this installation process. If there were to be a critical failure of the [REDACTED] and Columbia had no active spare, the scientific goals of the experiment would have been severely disrupted, and a significant amount of time lost. All data collection would have ceased requiring months of work by many scientists to regain the capability of completing the scope of the experiment. The cost of this type of disruption would have been far greater than the cost of a spare unit.

Additionally, as mentioned previously, purchasing a spare unit at the same time as the other unit was further necessitated by the fact that the production of this equipment was being terminated by the manufacturer. Although alternate units are available from other manufacturers, the existing experiment infrastructure would have to be significantly modified in order to adapt it for their use. Such modifications would also take considerable time and ultimately cost more than the spare unit. The additional unit was used on the NSF award as an active spare and was available for immediate use upon receipt of the unit.

WithumSmith+Brown questioned \$20,566 for the purchase of various parts

\$20,566 for the purchase of various parts. The parts, shipped on October 1, 2010 after the NSF award expired on September 30, 2010, were not received until after award expiration and therefore could not have benefitted this NSF award

Columbia Response:

Columbia disagrees with the WithumSmith+Brown conclusion. Columbia has concluded that the equipment purchase was a reasonable expenditure and allowable and allocable to the award. The benefit to the project in question was the completion of the science goal of recovering the core as planned in the project proposal. All changes were made with the knowledge and guidance of NSF. In this instance, the PI discussed the change in the timing of the completion of the project with the NSF Program Manager and subsequently received approval for the change from the Program Manager. The project proposal included the drilling of a core hole which Columbia endeavored to work with drillers from the US Geological Survey on. This attempt failed and as a result the PI revised the plans for the drilling of the core hole. The PI determined that the use of a [REDACTED] that [REDACTED] would prove to be more productive and arranged for approval of this change by the NSF Program Manager. There was a problem with invoicing and shipping which delayed the purchase. During the summer of 2012 the

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planned drilling was completed using the [REDACTED] securing the drilling goal of the award in question. The core [REDACTED] continues to be utilized on subsequent awards.

WithumSmith+Brown questioned \$17,788 for the purchase of various parts

\$17,788 for the purchase of a laser. CU stated that the purchase benefited the project because a loaner laser, which is the same as the one eventually purchased, was used on the project during 2011. However, the purchase made in December 2011 was not received until May 2012, five months after the NSF award expiration on December 31, 2011

Columbia Response:

Columbia disagrees with the WithumSmith+Brown conclusion. Columbia has concluded, after further review and discussion with the PI, that the equipment purchase was a reasonable expenditure and allowable and allocable to the award. In summary, the purchase was delayed due to the special circumstances described below. While the loaner laser benefited the project during 2011, the loaner laser was only provided under the condition that a purchase would be made when the laser became available. This condition was accepted to ensure that the project could be completed as designed.

The PI intended (as stated in the proposal) to purchase a laser in early 2011 but was unable to as the necessary laser was not available from the vendor and was not expected to be available for an extended period of time. The PI was able to negotiate with the vendor for the use of a loaner laser with the condition that a laser would be purchased when it became available. When the laser became available in December 2011, the PI placed the purchase order immediately, received the laser, returned the loaner laser and paid the invoice in May 2012.

Additionally, this has benefited a subsequent NSF project [REDACTED] 8/1/11-7/31/15). The topic of this project also requires the use of such a laser. The PI did not include the laser in the budget of the new award as he anticipated he would be able to utilize the laser purchased from the award in question.

WithumSmith+Brown questioned \$13,501 for the purchase of various parts

\$13,501 for the purchase of additional disk storage and a work station. Per CU, the additional disk storage for the computer cluster, and workstation enabled efficient pre-processing of some of the data and continued to be used past the NSF award expiration for similar purposes. However, the storage purchased on June 6, 2012 and the work station purchased on June 13, 2012 on a three-year award that expired on June 30, 2012 were available for less than 2 percent of the grant life (24 out of 1,095 days)

Columbia Response:

Columbia disagrees with the WithumSmith+Brown conclusion. Columbia has concluded that the equipment purchase was a reasonable expenditure and allowable and allocable to the award. The equipment in question which was purchased shortly before the end date of the award was used following the expiration of the award (and continues to be used on NSF awards to this day) to do

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research proposed for under the proposal/award.

WithumSmith+Brown questioned \$5,704 for the purchase of various parts

\$5,704 for the purchase of a computer. Per CU, a laboratory computer was necessary to carry out the NSF award, because 1) the award is specifically and solely for computation; 2) the need to connect continuously from the laboratory to NSF-supported supercomputer sites; 3) the old computer was becoming progressively less effective at carrying out high-speed data transfers; and 4) the computer support contract was expiring. However, the computer, purchased on May 3, 2013, on a four-year award that expired on July 31, 2013 was only available for 6 percent of the NSF grant life (89 out of 1,460 days)

Columbia Response:

Columbia disagrees with the WithumSmith+Brown conclusion. Columbia has concluded that the equipment purchase was a reasonable expenditure and allowable and allocable to the award. A laboratory computer was necessary to carry out the award, because (1) the award is specifically and solely for computation and (2) the PI must be able to connect continuously from his laboratory to NSF-supported supercomputer sites. As the existing computer supporting the necessary computations was becoming progressively less effective at carrying out high-speed data transfers and its support contract was expiring it was determined that a new computer was needed to support the project. Considerable progress was made during the final 89 days of the grant as a result of this purchase.

FINDING 3 – UNSUPPORTED AND UNALLOCABLE TRANSACTIONS

WithumSmith+Brown questioned costs of \$31,382 of which Columbia agrees with the conclusion for \$22,564 of the questioned costs and has removed these costs from the respective awards. Columbia disagrees with the conclusion for \$8,818 of the questioned costs and will work with the Cost Analysis & Audit Resolution Branch within the Division of Institution and Award Support of the NSF to determine if any inappropriate costs have been claimed. Columbia has provided all relevant documents related to these expenditures to WithumSmith+Brown during the course of the audit.

Below please find a detailed response for the finding identified by WithumSmith+Brown with which Columbia disagrees.

WithumSmith+Brown questioned \$8,818 for housing costs

\$8,818 for housing costs. Adequate documentation was not provided. The invoice from the Office of Residential Services [REDACTED] College, shows the rental of 20 rooms, for various dates, with a total cost of \$16,400. CU states that the housing costs were initially charged to another grant in May 2011 as part of the bulk reservation and then expenses were moved to this NSF award via a journal voucher in June 2011. The journal voucher was not provided as support and the methodology for the allocation of expenses to this NSF award was not supported. Additionally, this NSF award expired in June 2011, the month the expenses were transferred to the award and

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CU's explanation of benefit to the award appears to be talking about a different transaction

Columbia Response:

Columbia disagrees with the WithumSmith+Brown conclusion. Columbia has concluded that these were reasonable expenditures and allowable and allocable to the award. There was partial support for the conference housing with [REDACTED] College Residential Services for [REDACTED]. This allowed for the PI to host several visiting collaborators who were also attending the conference to discuss recent developments on the Poincare conjecture. Such research was one of two primary focuses of this proposal. Housing costs were initially charged to another grant [REDACTED] in May 2011 as part of the bulk reservation for administrative convenience. Once the information was available to appropriately allocate the charges, they were allocated between the grants as shown in the supporting documents.

FINDING 4 – UNREASONABLE OR UNALLOWABLE TRANSACTIONS

WithumSmith+Brown questioned costs of \$25,991 of which Columbia agrees with the conclusion for \$25,069 of the questioned costs and has removed these costs from the respective awards. Columbia disagrees with the conclusion for \$922 of the questioned costs and will work with the Cost Analysis & Audit Resolution Branch within the Division of Institution and Award Support of the NSF to determine if any inappropriate costs have been claimed. Columbia has provided all relevant documents related to these expenditures to WithumSmith+Brown during the course of the audit.

Below please find a detailed response to each finding identified by WithumSmith+Brown with which Columbia disagrees.

WithumSmith+Brown questioned \$755 for airfare

\$755 for the Portland portion of a multi-leg flight for a research presentation at a conference not directly related to the award, which would, therefore, be unallowable. CU initially indicated that the Portland portion of the flight was chargeable to a departmental account. They subsequently revised their position and stated that the entire flight should be charged to this award

Columbia Response:

Columbia disagrees with the WithumSmith+Brown conclusion. Columbia has concluded that, after further review and discussion, these were reasonable expenditures and allowable and allocable to the award. The proposal budget did not anticipate that many conference publications would require travel. [REDACTED] work was accepted to the conference where she presented her work. Participation significantly increased the broader impact of the project by disseminating research results to the scientific community. There were no funds allocated for this award.

WithumSmith+Brown questioned \$167 for airfare

\$167 for same-day flight change fees. These charges were not necessary and did not benefit the

AWARDEE RESPONSE

Columbia University
 Response to Audit of Incurred Costs for National Science Foundation Awards For the Period April 1, 2010 to
 March 31, 2013
 June 21, 2016

award

Columbia Response:

Columbia disagrees with the WithumSmith+Brown conclusion. Columbia has concluded that these were reasonable expenditures and allowable and allocable to the award. A single day was designated for student presentations. The activity was an important part of the professional development of students, which is an important goal of all NSF-funded research. The same day flight changes were necessary for the students' timely return to classes. The training ended before noon that day which caused the students concern about weather delays and returning to classes.

FINDING 5 – TRANSACTIONS AFTER AWARD EXPIRATION

WithumSmith+Brown questioned costs of \$22,414 of which Columbia agrees with the conclusion for \$22,414 of questioned costs and has removed these costs from the respective awards.

FINDING 6 – PURCHASES BEFORE AWARD EFFECTIVE DATE

WithumSmith+Brown questioned costs of \$3,198 of which Columbia disagrees with the conclusion for \$3,198 of the questioned costs and will work with the Cost Analysis & Audit Resolution Branch within the Division of Institution and Award Support of the NSF to determine if any inappropriate costs have been claimed. Columbia has provided all relevant documents related to these expenditures to WithumSmith+Brown during the course of the audit.

Below please find a detailed response to each finding identified by WithumSmith+Brown with which Columbia disagrees.

WithumSmith+Brown questioned \$ 3,198 for the purchase of equipment.

\$3,198 for the purchase of a MacBook Pro on March 12, 2011 on an award that did not begin until July 1, 2011. NSF approval had not been received; and therefore, the costs are questioned

Columbia Response:

Columbia has provided all relevant supporting documents during the course of the audit. Columbia disagrees with WithumSmith+Brown conclusion. The PI's computer ceased working requiring him to immediately purchase another immediately to write papers and run Monte Carlo Simulations for the project.

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AWARDEE RESPONSE

Columbia University
Response to Audit of Incurred Costs for National Science Foundation Awards For the Period April 1, 2010 to
March 31, 2013
June 21, 2016

Columbia is committed to complying with all applicable NSF policies and guidelines and maintains a strong internal control environment designed to support this commitment. As robust training for faculty, including Officers of Instruction and Officers of Research, and staff supporting NSF awards is an integral part of our control environment, Columbia will utilize this audit to further enhance its' training programs.

We appreciate the professionalism with which this audit was performed and will continue to work with WithumSmith+Brown, the NSF OIG and the NSF Division of Institution and Award Support to resolve the findings identified in this report. We will be happy to provide additional information as needed.

Sincerely,

A large black rectangular redaction box covering the signature of the Controller.

Controller

OBJECTIVES, SCOPE, AND METHODOLOGY

Our audit included assessing the allowability, allocability and reasonableness of costs claimed by Columbia on the quarterly Federal Financial Reports (FFR) and through the Award Cash Management Service (ACMS) for the three-year period beginning April 1, 2010 through March 31, 2013. We also reviewed the accuracy, reasonableness, and timeliness of Columbia's ARRA reporting.

The audit was performed in accordance with *Government Auditing Standards* for performance audits. The audit objectives were to:

1. Identify and report on instances of unallowable, unallocable, and unreasonable costs from the transactions tested;
2. Identify and report on instances of noncompliance with regulations, Federal financial assistance requirements (e.g. Office of Management and Budget Circulars), and the provisions of the NSF award agreements as it relates to the transactions tested; and
3. Determine the reasonableness, accuracy, and timeliness of the awardee's ARRA quarterly reporting, including reporting of jobs created under ARRA and grant expenditures for the two most recent quarters.

To accomplish our objectives, we assessed the reasonableness, accuracy, and timeliness of the awardee's ARRA quarterly reporting, including reporting of jobs created under ARRA and grant expenditures for the two most recent quarters, by 1) recomputing the number of jobs created or retained in compliance with OMB Memorandum M-10-08, *Updated Guidance on the American Recovery and Reinvestment Act – Data Quality, Non-Reporting Recipients, and Reporting of Job Estimates*; 2) reconciling expenditures per the general ledger to the ARRA expenditures; and 3) reviewing the ARRA reporting submission dates.

To aid in determining reasonableness, allowability, and allocability of costs, we obtained from Columbia all awards for which costs were reported to NSF during the period of April 1, 2010, through March 31, 2013. This provided an audit universe of approximately \$251 million, in approximately 129,000 transactions, across 920 individual NSF awards and an NSF ARRA universe of approximately \$30 million of expenditures, in more than 15,000 transactions, across 65 NSF awards.

Our work required reliance on computer-processed data obtained from Columbia and NSF. At our request, Columbia provided detailed transaction data for all costs charged to NSF awards during our audit period. We also obtained award data directly from NSF which was collected by directly accessing NSF's various data systems. To select transactions for further review, we designed and performed automated tests of Columbia 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 Columbia by: 1) comparing costs charged to NSF award accounts within Columbia's accounting records to reported net expenditures, as reflected in Columbia's quarterly 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 Columbia used to extract transaction data from its accounting records and systems.

Based on our testing, we found Columbia 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

OBJECTIVES, SCOPE, AND METHODOLOGY

fiscal years 2010 and 2011 found no reportable instances in which NSF's financial management systems did not substantially comply with applicable requirements.

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

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

- Public Law 111-5, *American Recovery and Reinvestment Act of 2009*;
- OMB Circular A-21, *Cost Principles for Educational Institutions* (2 C.F.R., Part 220);
- OMB Circular A-110, *Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations* (2 C.F.R., Part 215);
- OMB Memorandum M-10-08, *Updated Guidance on the American Recovery and Reinvestment Act – Data Quality, Non-Reporting Recipients, and Reporting of Job Estimates*;
- NSF Proposal and Award Policies and Procedures Guide (includes the Grant Proposal Guide and Award and Administration Guide);
- NSF Award Specific Terms and Conditions; and
- NSF Federal Demonstration Partnership Terms and Conditions.

The remaining attachments contain non-public material and are not posted.