

At a Glance



Performance Audit of Incurred Costs — University of California, San Diego

Report No. 17-1-006, March 29, 2017

Audit Objective

The National Science Foundation Office of Inspector General (OIG) engaged WithumSmith+Brown (WSB) to conduct a performance audit of incurred costs at University of California, San Diego (UCSD) for the period April 1, 2012, to March 31, 2015. The audit universe included more than \$197 million in costs claimed to NSF. The objective of the audit was to determine if costs claimed by UCSD during this period were allocable, allowable, reasonable, and in conformity with NSF award terms and conditions and applicable Federal financial assistance requirements.

WSB is responsible for the attached auditor's 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 five findings in the report with associated recommendations for NSF to resolve the questioned costs and to ensure UCSD strengthens administrative and management controls.

Contact Information

For further information, contact NSF OIG at (703) 292-7100 or oig@nsf.gov.

Audit Results

Costs UCSD charged to its NSF-sponsored agreements did not always comply with Federal and NSF award requirements. The auditors questioned \$283,801 of costs claimed by UCSD during the audit period. Specifically, auditors found:

- \$214,177 in equipment, materials, and supplies expenses unreasonably purchased near award expiration;
- \$54,472 in unreasonable travel;
- \$8,744 in unreasonable participant support expenditures;
- \$5,178 in unallowable indirect costs; and
- \$1,230 in unallocable visa immigration fees.

Awardee Response

Of the five findings in the report, UCSD agreed in total with two, partially agreed with two, and disagreed with one. UCSD contends that the costs within the disputed findings are allowable and disagreed with the auditors' interpretation of the Federal guidance. UCSD also did not agree with the auditors' statements that there were weaknesses in management and administrative controls. After taking UCSD's comments into consideration, the auditors continue to question the costs and left the findings unchanged.

UCSD's response is attached in its entirety to the report as Appendix A.




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

MEMORANDUM

Date: March 29, 2017

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

Jamie French
Director, Division of Grants and Agreements

From: Mark Bell
Assistant Inspector General, Office of Audits 

Subject: Audit Report No. 17-1-006,
University of California, San Diego

This memo transmits the WithumSmith+Brown (WSB) report for the audit of costs totaling approximately \$197 million charged by University of California, San Diego (UCSD) to its sponsored agreements with the National Science Foundation during the period April 1, 2012, to March 31, 2015. The objective of the audit was to determine if costs claimed by UCSD during this period were allocable, allowable, reasonable, and in conformity with NSF award terms and conditions and applicable Federal financial assistance requirements.

In accordance with Office of Management and Budget Circular A-50, Audit Followup, please provide a written corrective action plan to address the report 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 report.

OIG Oversight of Audit

To fulfill our responsibilities under generally accepted government auditing standards, the Office of Inspector General:

- 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.

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: Dr. Joan Ferrini-Mundy, Chief Operating Officer (Acting), OD
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**University of California, San Diego
Audit of Incurred Costs for
National Science Foundation Awards
For the Period April 1, 2012 to March 31, 2015**

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ACRONYMS

CFR	Code of Federal Regulation
DIAS	Division of Institution and Award Support
NSF	National Science Foundation
OIG	Office of Inspector General
OMB	Office of Management and Budget
PI	Principal Investigator
UCSD	University of California, San Diego

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. The University of California, San Diego (UCSD) is an NSF award recipient.

UCSD is a research university with an academic portfolio that includes 6 undergraduate colleges and 10 academic divisions and professional schools. The university’s mission is to educate, generate and disseminate knowledge, and engage in public service. In fiscal year 2014, UCSD received \$644 million in sponsored Federal research dollars.

WithumSmith+Brown, under contract with NSF OIG, audited the costs claimed by UCSD on NSF awards for the period beginning April 1, 2012, and ending March 31, 2015. The audit objective was to determine whether the costs claimed complied with NSF award terms and conditions and Federal financial assistance requirements. 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 detailed in Appendix B.

Results in Brief

To aid in determining reasonableness, allowability, and allocability of costs, we obtained from UCSD all transactions comprising costs claimed on NSF awards during the period of April 1, 2012, through March 31, 2015. This provided an audit universe of approximately \$197 million, in approximately 252,000 transactions, across 708 individual NSF awards. For transaction testing we judgmentally selected 286 transactions totaling \$2.5 million and utilized a data analytics approach to identify potential risk areas. We also performed additional non-transaction based tests as we deemed necessary.

Of the \$2.5 million in the transaction testing, our audit questioned \$283,801 of costs claimed on 19 NSF awards because UCSD did not comply with Federal and NSF award requirements. Specifically, we noted: \$214,177 in unreasonable equipment, materials, and supplies expenses; \$54,472 in unreasonable travel; \$8,744 in unreasonable participant support expenditures; \$5,178 in unallowable indirect costs; and \$1,230 in unallocable visa immigration fees. These questioned costs resulted in five areas identified where UCSD controls could be improved to ensure compliance with laws and regulations.

UCSD reviewed and agreed with the facts for \$50,748 in questioned costs. UCSD did not agree with \$233,053 in questioned costs: 1) \$174,581 in unreasonable equipment, materials, and supplies

expenses; 2) \$54,472 in unreasonable travel; and 3) \$4,000 in unreasonable participant support expenditures. 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 (DIAS), Resolution and Advanced Monitoring Branch.

Findings and Recommendations

Finding 1 – Unreasonable Equipment, Materials, and Supplies Charges

Equipment, materials, and supply expenses totaling \$214,177 charged to 14 NSF awards were not necessary or reasonable in accordance with Federal cost principles.

According to 2 Code of Federal Regulation (CFR) 220 (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 or 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, NSF’s *Award and Administration Guide*, Chapter V, Section A.2.c states that a grantee should not purchase items of equipment, computing devices, or restock materials and supplies where there is little or no time left for such items to be utilized in the actual conduct of the research.

Unreasonable Equipment Purchases

We questioned \$158,940 charged to one NSF award for equipment and accessories. Specifically, we questioned the following purchases:

- \$62,767 for the purchase of two environmental rooms. UCSD agreed that \$31,383 (50 percent) of the purchase should have been allocated to other projects receiving benefit. UCSD did not provide support for the allocation of the equipment’s usage, and therefore, we continue to question the remaining 50 percent.
- \$62,752 for the purchase of equipment parts for a wide-field laser illuminator.
- \$33,421 for the purchase of a camera and accessories.

The original NSF award budget included \$125,000 for equipment; however, when the NSF Program Office required budget reductions, the Principal Investigator (PI) voluntarily removed the equipment from the budget because he believed the existing equipment would be sufficient to reach the goals of the project. Despite the voluntary removal of the equipment from the budget,

the PI spent \$158,940 on equipment in the first year of this 5-year award. This was a 21 percent increase over the original equipment budget that was eliminated.

We are questioning whether it was reasonable or prudent for the awardee to claim charges for items specifically requested and subsequently removed from the budget, per NSF's budget reduction request.

Computer Purchases

We questioned \$24,882 charged to seven 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.

- \$8,340 for the purchase of two Mac Pros. The computers were received on September 23, 2013, on a 4-year award that expired on September 30, 2013. The two computers were available for less than 1 percent of the grant life (7 out of 1,460 days).
- \$6,629 for the purchase of a MacBook Pro, two storage arrays, and other computer accessories that were charged to the NSF award by mistake. UCSD has taken corrective action to remove the charges from the NSF award.
- \$4,044 for the purchase of two MacBook Airs. The computers were purchased on June 13, 2013, on a 4-year award that expired on June 30, 2013. The two computers were available for 1 percent of the grant life (17 out of 1,445 days).
- \$2,071 for the purchase of an iMac. The computer was purchased on May 8, 2013, on a 4-year award that expired on May 31, 2013. The computer was available for less than 2 percent of the grant life (23 out of 1,460 days).
- \$2,071 for the purchase of a MacBook Air. The computer was purchased on March 5, 2014, on a 5-year award that expired on July 31, 2014. The computer was available for 8 percent of the grant life (148 out of 1,825 days). UCSD stated the computer was not used exclusively on the NSF award as it was the PI's sole computer and he also used it to carry out other activities to support his teaching, departmental service, and research missions.
- \$1,076 for the purchase of a Dell computer. The computer was received on August 23, 2013, on a 4-year award that expired on August 31, 2013. The computer was available for less than 1 percent of the grant life (8 out of 1,445 days).
- \$651 for the purchase on an iPad. The iPad, shipped on April 6, 2012, after the NSF award expired on March 31, 2012. The iPad was not received until after award expiration, and therefore, could not have benefitted this NSF award.

Materials and Supplies

We questioned \$30,355 charged to six awards for materials and supplies purchased near the award expiration that did not appear to benefit the award or that did not appear necessary considering the limited time remaining on the awards.

We questioned \$11,954 charged to four awards for materials and supplies. Specifically, we questioned the following purchases:

- \$5,066 for the purchase of tip seal kits and permeation test tubes. The supplies were purchased on September 23, 2013, on a 3-year award that expired on September 30, 2013. The supplies were purchased 7 days prior to award expiration (7 out of 1,095 days).
- \$3,334 for the purchase of a tube furnace on July 24, 2014, on a 4-year award that expired on July 31, 2014. The item was not received until August 5, 2014, 5 days after the award expiration.
- \$1,584 for the purchase of software. The software license was purchased on October 1, 2014, on a 5-year award that expired on September 30, 2014. The software was not purchased until after the award expiration. UCSD concurs and has agreed to remove the cost from the award.
- \$1,970 for an annual membership to the Transaction Processing Council. The annual membership covered the period of January 1 through December 31, 2013. The award expired on January 31, 2013 — 1 month after the annual membership period began.

We questioned \$13,697 charged to one award for materials and supplies. Specifically, we questioned the following purchases:

- \$7,332 for the purchase of a microtome, oscilloscope, and automatic knife sharpener. The supplies were purchased on August 16, 2012, on a 6-year award that expired on August 31, 2012. The supplies were purchased with just 15 days remaining before award expiration (15 out of 2,175 days).
- \$3,529 for the purchase of chloroform, dissect blade, kaleidoscope, balance, stirrer/hot plate, and other laboratory supplies. The supplies were shipped on August 30, 2012, with 1 day remaining before award expiration. These supplies were not received until after the award expiration, and therefore, could not benefit the award.
- \$1,824 for the purchase of a 30" flat panel monitor. The monitor was purchased on August 1, 2012, on a 6-year award that expired on August 31, 2012. The monitor was available for 1 percent of the grant life (30 out of 2,175 days).
- \$1,012 for the purchase of a refrigerator. The refrigerator was delivered on September 11, 2012, after the NSF award expired on August 31, 2012.

We questioned \$4,704 charged to one award for materials and supplies. Specifically, we questioned the following purchases:

- \$2,793 for giant microbe figures. The figures were received on August 19, 2014, on a 6-year award that expired on August 31, 2014. The figures were available for less than 1 percent of the grant life (12 out of 2,190 days).
- \$1,911 for robot parts. The parts were received on August 29, 2014, on a 6-year award that expired on August 31, 2014. The parts were available for less than 1 percent of the grant life (2 out of 2,190 days).

UCSD personnel did not adequately review the expenditures charged to the NSF awards, which resulted in questionable costs. Without an effective process in place to ensure the allowability 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. UCSD indicated that it has performed corrective actions to remove \$39,596 in unallowable costs from the awards in question, leaving \$174,581 remaining unresolved. NSF, during the audit resolution process, should ensure that the award has been credited as appropriate.

Recommendation 1:

We recommend that the NSF's Director of the DIAS request that UCSD:

- 1) Resolve the \$174,581 of questioned costs and ensure the \$39,596 of questioned costs has been removed from the NSF award.
- 2) Strengthen the administrative and management controls and processes for reviewing and approving costs charged to NSF awards for equipment, materials and supplies.

Summary of Awardee Response:

Unreasonable Equipment Purchases

UCSD does not concur with questioned costs totaling \$127,557. UCSD stated that when the equipment was removed from the NSF award budget, UCSD believed that existing equipment could be *used* to complete the aims of the project. However, after the project was awarded, UCSD was unable to use the available equipment to reach the goals of the project and determined the project could not be completed without the equipment purchases. The equipment was purchased in the first year of the 5-year NSF CAREER award. UCSD stated that NSF continues to benefit from the equipment.

UCSD agrees that \$31,383 (50 percent) of the cost of the two environmental rooms should be removed and allocated to the other projects receiving benefit.

Computer Purchases

UCSD does not concur with questioned costs totaling \$18,253 for computer purchases charged to seven awards. UCSD believes these questioned costs benefitted the awards charged and were reasonable and necessary for the performance of the sponsored agreement. For each of the costs we questioned, UCSD provided a detailed response as to why the institution believes the costs were necessary and reasonable and how they benefitted the awards.

UCSD agrees with the conclusion for \$6,629 of questioned costs and agrees to refund \$6,629.

Materials and Supplies

UCSD does not concur with the questioned costs totaling \$28,771 for materials and supplies purchases charged to five awards. UCSD believes these questioned costs benefitted the awards charged and were reasonable and necessary for the performance of the sponsored agreement. For each of the costs we questioned, UCSD provided a detailed response as to why the institution believes the costs were necessary and reasonable and how they benefitted the awards.

UCSD agrees with the conclusion for \$1,584 of questioned costs and agrees to refund \$1,584.

See Appendix A for the complete UCSD response.

Auditor Comments:

Unreasonable Equipment Purchases

For the \$127,557 of equipment purchases that UCSD disagreed with, our conclusions remain unchanged. The additional information provided by UCSD did not change our view that these unreasonable and unallocable equipment and accessory purchases, as noted above in Finding 1, should be questioned. To be allowable for a Federal grant, a cost must be allocable and reasonable for the administration and performance of the award. No allocation methodology for the environmental rooms has been provided. Furthermore, the total equipment and accessory purchases represent 14 percent of the total award budget of \$1.14 million. Therefore, the report finding and recommendations remain as stated.

UCSD's comment related to the \$31,383 (50 percent) of the cost of the environmental rooms is responsive to the issue noted in this finding. Once NSF determines that \$31,383 in questioned costs has been returned, this portion of the issue should be closed.

Computer Purchases

For the \$18,253 of computer purchases that UCSD disagreed with, our conclusions remain unchanged. The additional information provided by UCSD did not change our view that these purchases near the various award expiration dates, as noted above in Finding 1, should be questioned. A grantee should not purchase items of equipment, computing devices, or restock materials and supplies where there is little or no time left for such items to be utilized in the actual conduct of the research. Four of the computers were available for less than 2 percent of the grant life, one computer was received after the award expiration, and one computer was available for 8 percent of the grant life but was not used solely on the NSF award, and appeared to be a general purpose computer. Therefore, the report finding and recommendations remain as stated.

UCSD's comment related to the \$6,629 is responsive to the MacBook Pro purchase noted in this finding. Once NSF determines that \$6,629 in questioned costs has been returned, this issue related to the MacBook Pro purchase should be closed.

Materials and Supplies

For the \$28,771 of materials and supplies purchases that UCSD disagreed with, our conclusions remain unchanged. The additional information provided by UCSD did not change our view that these purchases near the various award expiration dates, as noted above in Finding 1, should be questioned. According to NSF policy, a grantee should not purchase items of equipment, computing devices, or restock materials and supplies where there is little or no time left for such items to be utilized in the actual conduct of the research. All of the questioned materials and supplies were purchased with less than 1 percent of the grant life remaining, and several were received after the award expiration. Therefore, the report finding and recommendations remain as stated.

UCSD's comment related to the \$1,584 is responsive to the software purchase noted in this finding. Once NSF determines that \$1,584 in questioned costs has been returned, this issue related to the software purchase should be closed.

Finding 2 – Unreasonable Travel

Travel expenses totaling \$54,472 charged to two NSF awards were not necessary or reasonable in accordance with Federal cost principles.

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, Appendix A, Section C.3, provides that a reasonable cost is one that a "prudent person would have incurred under similar circumstances."

We questioned \$48,556 (\$31,426 plus \$17,130 associated indirect costs) charged to one NSF award for seven foreign travel trips. The following leads us to conclude that the foreign travel trips were not reasonable or prudent for the administration of the award:

- The travel expenses were not approved and charged to the NSF award until one to two years after the travel occurred.
- The award was on its second no-cost extension when the travel was approved by UCSD.
- No travel was requested in the NSF award budget, but 14 percent of the award budget was rebudgeted for travel.
- The funds spent on travel were originally budgeted to fund graduate student researchers.
- The travel was not mentioned in the annual reports or the final report.
- The lack of a clear benefit and necessity to the award for any of these trips.

The actual travel occurred between March 2011 and October 2012. Of the seven trips, four of the travel expense forms were dated August 2013 and three were dated June 2013, which was 1 to 2 years after the travel occurred.

Per UCSD, these reimbursements were not submitted timely because they were set aside in favor of conducting more productive (and urgent) work activities in research, teaching, and service. The reimbursements were submitted when it was recalled and realized that the reimbursements would be forfeited once the award expired.

UCSD travel policies require travel expense claims be submitted within 45 days after the end of a trip. Travel reimbursement requests submitted more than 45 days after travel are left to the discretion of the campus. Per UCSD, the referenced travel events were approved because they were deemed by the travel office to be reasonable, prudent, and relevant to advancing the work under the sponsored agreement and within its project period. However, not only were the travel expense claims not approved timely (1 to 2 years after the travel occurred), but also the award was on its second no-cost extension when the travel was approved by UCSD. It is not reasonable that the \$31,426 in unsubmitted travel reimbursements were not mentioned in either of the two no-cost extensions filed after the travel was taken.

Additionally, the NSF award budget did not include travel. The cumulative NSF award budget was \$599,765. During our audit period, we noted \$85,932 in travel costs charged to this NSF award; this represents 14 percent of the cumulative award budget.

Per UCSD, given the budget limit for the solicitation and the growing lab, UCSD wanted to fund as many graduate student researchers as possible. UCSD anticipated receiving unrestricted gift monies to fund the project's travel expenses. Thus, three students and zero travel dollars were budgeted into the project. At the time of the award, only two qualified students were available to work on the project, so the unused student salary was reallocated for travel.

We tested \$62,705 of these travel costs and questioned \$48,556 in foreign travel expenses for one individual charged to the NSF award:

- \$16,588 for travel expenses incurred from April 27 to June 22, 2011, while at the [REDACTED] in [REDACTED]. Airfare and per diem were charged to the NSF award while at the [REDACTED]; however, neither the travel, nor the collaboration with the [REDACTED] was mentioned in the annual report. There were also charges to attend a conference in [REDACTED] from June [REDACTED], 2011. The travel expense form was dated August 12, 2013; more than 2 years after the travel occurred.
- \$6,671 for travel to [REDACTED], from March [REDACTED], 2011, to attend a conference. The travel expense form was dated August 12, 2013; almost 2.5 years after the travel occurred.
- \$6,065 for travel to [REDACTED], from March 23 to April 2, 2012, for a conference. The conference was from March [REDACTED], 2012. The travel expense form was dated August 12, 2013; almost 1.5 years after the travel occurred.
- \$5,710 for travel to [REDACTED], from June 25 to July 11, 2012, to sit on a [REDACTED] committee and for a research visit with an advisor. The travel expense report was dated June 11, 2013; 1 year after the travel occurred.
- \$4,659 for travel to [REDACTED], from August 31 to September 9, 2012, to attend a workshop from September [REDACTED], 2012. The travel expense report was dated June 4, 2013; 9 months after the travel occurred.
- \$4,603 for travel to [REDACTED], from October 13-20, 2012, to attend a three-day workshop. The travel expense report was dated June 4, 2013; 7 months after the travel occurred.
- \$4,260 for travel to [REDACTED], from October 13-23, 2011, to attend a seminar from October [REDACTED], 2011. The travel expense report was dated August 12, 2013; almost 2 years after the travel occurred.

Additionally, we questioned \$5,916 charged for foreign meals and lodging per diem for a senior personnel on one NSF award. The travel occurred from June 27 to August 27, 2013. The award expired on August 31, 2013. There was no travel in the NSF award budget and there was no mention of the travel in the final report.

UCSD personnel did not adequately review the expenditures charged to NSF awards, which resulted in unreasonable travel costs. Without an effective process in place to ensure the

reasonableness of the travel costs and consistency with the award objectives, 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 2:

We recommend that the NSF's Director of the DIAS request that UCSD:

- 1) Resolve the \$54,472 of questioned costs.
- 2) Strengthen the administrative and management controls and processes for reviewing and approving costs charged to NSF awards for travel expenditures.

Summary of Awardee Response:

UCSD does not concur with the questioned costs totaling \$54,472 for travel expenses for one individual charged to two NSF awards. UCSD stated that unspent funds were rebudgeted to travel, which was within the University's rebudgeting authority under the Federal Demonstration Partnership. Traveling to conferences is important in the computer science community and presenting at conferences and workshops is the recognized method for disseminating results in the field. UCSD stated that they agree some of the travel expenses may have been submitted untimely, but it was not done with malicious intent. For each of the costs we questioned, UCSD provided a detailed response as to why the institution believes the travel benefited the awards.

See Appendix A for the complete UCSD response.

Auditor Comments:

For the \$54,472 of travel expenses that UCSD disagreed with, our conclusions remain unchanged. The additional information provided by UCSD did not change our view that these travel expenses, as noted above in Finding 2, should be questioned. If travel was necessary for the performance and administration of this award, then travel should have been included in the NSF award budget. Additionally, the travel reimbursements should have been submitted timely. These reimbursement requests were submitted one to two years after the travel occurred, when the award was on its second no-cost extension. It is not reasonable that the \$48,556 (\$31,426 plus \$17,130 associated indirect costs) in unsubmitted travel reimbursements was not mentioned in either of the two no-cost extensions filed after the travel had occurred.

The travel expenses totaling \$5,916 charged for foreign meals and lodging occurred June 27 to August 27, 2013, on an award that expired on August 31, 2013. There was no travel in the NSF award budget, and there was no mention of the travel in the final report. The travel was not necessary for the performance of the award. Therefore, the report finding remains as previously stated.

Finding 3 – Unallowable Participant Support Expenditures

Participant support expenditures totaling \$8,744 charged to two NSF awards were unallowable in accordance with Federal cost principles.

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, Appendix A, Section C.3, provides that a reasonable cost is one that a “prudent person would have incurred under similar circumstances.”

Per the NSF *Grant Proposal Guide* (effective Dec. 26, 2014) Chapter II, (C.2.g.v), participant support refers to costs for items such as stipends or subsistence allowances, travel allowances, and registration fees paid to or on behalf of participants or trainees in connection with NSF-sponsored conferences or training projects. Funds provided for participant support may not be used for other categories of expense without specific prior NSF written approval.

Specifically, we questioned the following unallowable participant support expenditures:

- \$4,744 for travel costs for UCSD employees charged to one award. No travel costs were included in the NSF approved budget; the entire award budget was for participant support. UCSD has agreed to remove the costs from the award.
- \$4,000 for social media and marketing services charged to one award. The total NSF award budget was \$15,000 for participant support funds to provide hotel accommodations and travel support for attendees at a workshop. UCSD spent 27 percent of the total NSF award budget on social media and marketing activities. UCSD did not receive prior NSF written approval to use participant support funds for the marketing activities.

UCSD personnel did not adequately review the expenditures charged to the NSF awards, which resulted in unallowable participant support costs. Without an effective process in place to ensure the reasonableness of expenditures, 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. UCSD indicated that it has performed corrective actions to remove \$4,744 in unallowable costs from the award in question, leaving \$4,000 remaining unresolved. NSF, during the audit resolution process, should ensure that the award has been credited as appropriate.

Recommendation 3:

We recommend that the NSF’s Director of the DIAS request that UCSD:

- 1) Resolve the \$4,000 of questioned costs and ensure the \$4,744 of questioned costs has been removed from the NSF award.
- 2) Strengthen the administrative and management controls and processes for reviewing and approving participant support transactions charged to NSF awards.

Summary of Awardee Response:

UCSD agrees with the conclusion for \$4,744 of questioned costs and agrees to refund \$4,744.

UCSD does not concur with questioned costs totaling \$4,000 for social media and marketing services. UCSD believes these questioned costs benefitted the award. UCSD stated these resources were used by the participants and contributed to their learning experience, and therefore, these

services were meaningful and necessary in support of each participants attendance and contribution at the workshop.

See Appendix A for the complete UCSD response.

Auditor Comments:

UCSD's comment related to the \$4,744 is responsive to the travel expenses noted in this finding. Once NSF determines that \$4,744 in questioned costs has been returned, this issue related to the travel expenses should be closed.

For the \$4,000 of social media and marketing services that UCSD disagreed with, our conclusions remain unchanged. The additional information provided by UCSD did not change our view that these social media and marketing services, as noted above in Finding 3, should be questioned. A grantee is required to obtain written authorization from the cognizant NSF program officer prior to the reallocation of funds budgeted for participant support. Therefore, the report finding and recommendations remain as stated.

Finding 4 – Unallowable Indirect Costs

Indirect (facilities and administrative) costs totaling \$5,178 charged to one NSF award were unallowable in accordance with Federal cost principles.

According to 2 CFR 220, Appendix A, Section G.2, 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. Equipment and capital expenditures are to be excluded from modified total direct costs.

Specifically, we questioned \$5,178 in indirect costs charged for the purchase of a component used for equipment fabrication. UCSD personnel stated that the equipment was part of a fabrication and should not have been assessed indirect costs.

UCSD personnel incorrectly coded the transaction as inventorial equipment, and therefore, it was assessed indirect costs. Without an effective process in place to ensure equipment is properly coded and excluded from modified total direct costs, there is the increased risk that funds may not be spent in accordance with Federal requirements. UCSD indicated that it has performed corrective actions to remove \$5,178 in unallowable costs from the award in question. NSF, during the audit resolution process, should ensure that the award has been credited as appropriate.

Recommendation 4:

We recommend that the NSF's Director of the DIAS request that UCSD:

- 1) Ensure the \$5,178 of questioned costs has been removed from the NSF award.
- 2) Strengthen the administrative and management controls and processes for reviewing and approving indirect costs charged to NSF awards.

Summary of Awardee Response:

UCSD agrees with the conclusion for \$5,178 of questioned costs and agrees to refund \$5,178.

See Appendix A for the complete UCSD response.

Auditor Comments:

UCSD's comment related to the \$5,178 is responsive to the issue noted in this finding. Once NSF determines that the recommendation has been adequately addressed and the \$5,178 in questioned costs has been returned, this issue should be closed.

Finding 5 – Unallocable Visa Immigration Fees

Visa immigration fees totaling \$1,230 charged to one NSF award were unallocable in accordance with Federal cost principles. In the first year after hire, the employee only worked 35 percent on the NSF award, but 100 percent of the visa fees were charged to the award. We are questioning 65 percent of the visa fees charged to the NSF award.

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 or 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.

UCSD personnel did not adequately review the expenditures charged to NSF awards which resulted in unallowable costs. Without an effective process in place to ensure the proper monitoring of visa fees charged, there is the increased risk that funds may not be spent in accordance with Federal requirements. UCSD indicated that it has performed corrective actions to remove \$1,230 in unallocable visa fees from the award in question. NSF, during the audit resolution process, should ensure that the award has been credited as appropriate.

Recommendation 5:

We recommend that the NSF's Director of the DIAS request that UCSD:

- 1) Ensure the \$1,230 of questioned cost has been removed from the NSF award.
- 2) Strengthen the administrative and management controls and processes for reviewing and approving visa fees charged to NSF awards.

Summary of Awardee Response:

UCSD agrees with the conclusion for \$1,230 of questioned costs and agrees to refund \$1,230.

See Appendix A for the complete UCSD response.

Auditor Comments:

UCSD's comment related to the \$1,230 is responsive to the issue noted in this finding. Once NSF determines that the recommendation has been adequately addressed and the \$1,230 in questioned costs has been returned, this issue should be closed.

WithumSmith+Brown, PC

Date

APPENDICES

AWARDEE RESPONSE

UNIVERSITY OF CALIFORNIA, SAN DIEGO

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March 16, 2017

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The University of California, San Diego (University) submits the following comments in response to WithumSmith+Brown's (WSB) draft report for the Audit of Incurred Costs for National Science Foundation (NSF) Awards for the period April 1, 2012 to March 31, 2015.

WSB identified five findings on 20 NSF awards. Responses to each are provided below.

1. Unreasonable Equipment, Materials, and Supplies Charges

WBS found that equipment, materials, and supply expenses totaling \$226,962 charged to 15 NSF awards were not necessary or reasonable in accordance with Federal cost principles.

A. Unreasonable Equipment Purchases

\$158,940 charged to one NSF award for equipment and accessories. Specifically, the following purchases were questioned:

- \$62,767 for the purchase of two environmental rooms,
- \$62,752 for the purchase of equipment parts for a wide-field laser illuminator, and
- \$33,421 for the purchase of a camera and accessories.

University Response:

The equipment expenses on award # [REDACTED] were reasonable and necessary to fulfill the aims of the award. We agree that a portion of the two environmental rooms should be allocated to the other projects receiving the benefit. However, at least \$127,556.5 [= \$158,940 - (\$62,767*50%)] directly benefited the award. When the PI removed the equipment from the budget, he had believed it would be possible to utilize existing equipment to complete the project's aims. However, after the project was awarded, the PI was unable to use the available equipment to reach the goals of the project. The PI, a reasonable and prudent person, determined that the project could not have been completed without the equipment purchases. The report suggests that because the PI voluntarily removed equipment from his budget, it was unreasonable to rebudget funds. The PI used his rebudgeting authority without any need for prior

AWARDEE RESPONSE

approval to purchase the necessary items. Additionally, the equipment was purchased in the first year, so the 5-year NSF award received benefit for the majority of the project period.

Furthermore, these expenses were made on the PI's CAREER award. Per NSF's website, these awards are given "in support of the early career-development activities of those teacher-scholars who most effectively integrate research and education within the context of the mission of their organization. Such activities should build a firm foundation for a lifetime of integrated contributions to research and education." These equipment expenses allowed the PI to build a foundation for his future research and education contributions, and NSF continues to benefit from the equipment.

B. Computer Purchases

\$24,882 charged to seven NSF awards for general-purpose computers purchased near the award expiration.

University Response:

The University does not concur with the auditor's conclusion for \$18,253 of the questioned expenses charged to five awards. Per 2 CFR 220, Appendix A, Section C.3, these costs should be considered reasonable as they were necessary for the performance of the sponsored agreement. Additionally, the award end date does not constitute end of the work performed for the award. Work continues to be performed after the expiration date of the project in order to complete the aims of the project. As defined by NSF Grant Policy Manual, the "expiration date is the date specified in the grant notice after which expenditures may not be charged against the grant except to satisfy obligations to pay allowable project costs committed on or before that date." The NSF Grant Policy Manual recognizes that it could be determined on the last day of the award that additional expenses are needed to complete the performance of the sponsored agreement.

We would also like to emphasize that Uniform Guidance (2 CFR 200) recognized that the requirements set forth in prior circulars relating to the direct charging of computing devices was overly restrictive. Uniform Guidance has eased those restrictions by allowing the direct charging of computing devices when they are essential and benefit the project, and no longer requires that the devices be solely dedicated to the project.

Justifications for questioned purchases are included below.

- \$8,340 for the purchase of two Mac Pros.

The goal of the project was to develop computational models of the nonverbal behavior and interactive strategies observed during face-to-face teaching, which would help advance the science of learning and teaching by improving our understanding of the dynamics of nonverbal behavior. The three specific goals were: (1) development and distribution of the proposed database, (2) determining and computational modeling of the behavior dynamics observed in the database. This includes development of machine perception primitives for automatic detection of key non-verbal behaviors and estimation of relevant affective and cognitive states, (3) evaluation of computational models using an android system (Einstein Tutor). The computers were used to program and collect data performed from robot simulations. There was a large amount of data

AWARDEE RESPONSE

and records that required that two laptops be purchased at the time for testing and reporting, which was a necessary need for completing the project. As per 2 CFR 220 Appendix A, Section C, the cost was reasonably incurred for the performance of the sponsored agreement.

- \$6,629 for the purchase of a MacBook Pro, two storage arrays, and other computer accessories that were charged to the NSF award by mistake.

The University concurs with the auditor's conclusion. Corrective action has been taken to remove the charges from the NSF award.

- \$4,044 for the purchase of two MacBook Airs.

The computers are necessary to conduct computer simulations and for implementation, debugging, testing and demonstrations of coordination algorithms. As stated in the proposal, a portion of the project was to determine how the evolution of the closed-loop network dynamical system affects the specific coupling among agents. Motion coordination algorithms for rendezvous and deployment were hypothesized to be a useful tool to study the posed questions. These computers were necessary in order to complete this vital portion of the award.

Computers are also needed to write papers and reports, prepare presentations and responses to reviewers. All these activities benefitted the award, even beyond the official end time of the projects. For example, journal decisions about papers typically linger well beyond the project official completion time, yet they involve substantial work in addressing reviewer's comments. The following three journal papers are examples of work performed after the grant end date:

- March 2014

[REDACTED]

- November 2013

[REDACTED]

- November 2013

[REDACTED]

In all 3 cases, the paper was accepted after the grant had finished, we had to address the last round of reviewers' comments, and prepare final submission materials. One laptop was assigned to [REDACTED] who complete tasks and the paper related to the award. [REDACTED] defended his thesis in Sept 2013, but continued to work with the PI as a co-supervised postdoc on work related to the award. The other laptop remained in the lab for work related with the award, including preparing material for conference and seminar presentations.

- \$2,071 for the purchase of an iMac.

AWARDEE RESPONSE

The computer purchase was essential to the mission/aim of the grant. As stated in the proposal, a module was offered for middle school students to offer hands-on science learning experiences for students. The purchase was used to show presentations in the classrooms participating in the module. The work it enabled was specifically proposed as part of the project (for broader impact), and the item was essential for that work. The project supported by this award continued under NSF award [REDACTED]

- \$2,071 for the purchase of a MacBook Air.

This expense was incurred as the PI's previous laptop had suffered terminal disk failure. As the sole computer for the PI, the purchase was necessary in order to conduct a variety of key activities that were required to continue work on the award. Without it, the PI would not have been able to continue functioning in his role for the award. Any prudent and reasonable person would replace the broken laptop in order to satisfy grant-related obligations.

The length of time the laptop was used during the grant's life does not accurately reflect the contribution of the laptop to this award and is not correlated with the 8% of the grant life mentioned by WSB. This is because the laptop was used during a stage in the project's lifecycle that naturally requires a burst of activities involving disproportionately high effort compressed in a short time frame. In particular, the PI used the laptop to write the yearly, final, and outcomes reports for the award (this represents over 1/3 of the overall reporting requirements despite the short time frame), conducting electronic communication with award collaborators, preparing written documents and presentation slides for result dissemination, developing curriculum extensions based on the award's results, human resource development, and finalizing the research.

- \$1,076 for the purchase of a Dell computer.

The computer purchase was essential to the mission/aim of the grant. As stated in the proposal, Aim 1 was to create an atlas of maize proteins. In order to do so, a wide variety of maize tissue types needed to be analyzed. The atlas includes the identity and relative amount of 40,000-50,000 proteins in each of 37 different tissues and stages of maize development. The atlas also includes the protein composition of the plasma membrane, chloroplast, mitochondrion, and peroxisome along with information about the protein changes caused by abiotic and biotic stress. Novel peptide mass spectrometry technologies based on recent innovations in chemistry and computer science were used to generate and analyze the data.

- \$651 for the purchase of an iPad.

The iPad was essential to the mission/aim of the grant. Per the proposal, spatial modeling was used "to construct measures of state preferences with respect to universal treaties... The basic notion behind implementations of the spatial model is that, by observing the choices political actors make, we can measure their preferences relative to each other and relative to the options with which they are faced." The iPad was used to collect data for this phase of the project, as well as for data and document storage/retrieval, which was important during periods of travel. The device was also used to conduct archival research, which was added as the project developed.

AWARDEE RESPONSE

C. Materials and Supplies

\$30,355 charged to six awards for materials and supplies purchased near the award expiration that did not appear to benefit the award or that did not appear necessary considering the limited time remaining on the awards.

University Response:

The University does not concur with the auditor's conclusion for \$28,771 of the questioned expenses charged to five awards. Per 2 CFR 220, Appendix A, Section C.3, these costs should be considered reasonable as they were necessary for the performance of the sponsored agreement. Additionally, the award end date does not constitute end of the work performed for the award. Work continues to be performed after the expiration date of the project in order to complete the aims of the project. As defined by NSF Grant Policy Manual, the "expiration date is the date specified in the grant notice after which expenditures may not be charged against the grant except to satisfy obligations to pay allowable project costs committed on or before that date." The NSF Grant Policy Manual recognizes that it could be determined on the last day of the award that additional expenses are needed to complete the performance of the sponsored agreement.

Justifications for questioned purchases are included below.

- \$5,066 for the purchase of tip seal kits and permeation test tubes.

The sampled award is a Cooperative Agreement that is part of NSF's Centers for Chemical Innovation (CCI). Per the program solicitation, "the CCI program is a two-phase program... Phase I CCIs receive significant resources to develop the science and integrative elements of a CCI before requesting Phase II funding... CCI awards support the formation and development (Phase I) or sustained funding (Phase II) of research centers that can address major challenges in fundamental chemistry." The PI had received notification that the program directors would recommend the center for Phase II and the purchases were made in order to benefit the Cooperative Agreement's continuity of research efforts. It would be unreasonable to delay the research by waiting to purchase the expenses.

- \$3,334 for the purchase of a tube furnace on July 24, 2014 on a 4-year award that expired on July 31, 2014.

The purchase of McQueen tube furnace above was necessary for synthesis of magnetic nanocapsules, which was time-consuming and quite delicate. The capsule starts with a core-shell structure of porous silica as the shell and polystyrene polymer as the core material. The nanocapsules have to be heat treated very carefully at various temperatures and times near 500 degree C temperature regime to burn away the polystyrene so as to create hollow capsules, and consolidate the magnetic nanoparticles we intentionally trapped within the capsule. Once such a hollow space is created, we insert the drug we want to deliver into the hollow space, and the drug release is activated by remote magnetic field heating of the capsule with the drug and trapped magnetic nanoparticles. This furnace was exclusively used for the NSF award project.

AWARDEE RESPONSE

- \$1,584 for the purchase of software

The University concurs with the auditor's conclusion. The University agrees to refund \$1,584.

- \$1,970 for an annual membership to the Transaction Processing Council.

This membership allowed the PI to be an academic affiliate of the Transaction Processing Council (TPC). The TPC is the industry organization for establishing industry standard benchmarks. The work we started to establish the Workshop on Big Data Benchmarking (WBDB), as a result of research in this project, directly led to the discussion and subsequent development of one industry standard benchmark for big data called, TPCx-HS or TPC Express for Hadoop Systems, and to the creation of a second industry standard, TPCx-BB for TPC Express BigBench. Both of these benchmarks were first proposed in our WBDB workshops- which we started because of the work we did in this particular NSF/IIS 0844530 "Performance Evaluation of On-Demand Provisioning Strategies for Data Intensive Applications" project. They are directly attributable to NSF funding.

The TPC membership allowed us to continue to engage with the industry standards group so that we could see the work we had started under the grant come to fruition after the grant ended. Developing standards may take some while. If we had not participated in TPC, we would have been "invisible" in the process. It would not have been possible to participate in standards meetings, to help push forward the benchmark agenda, and could not take full credit for all the hard work done under the NSF grant. The purchase was a high strategic value and essential to get the most out of significant NSF investments.

Additionally, the end date of the award does not constitute the end date of work performed for the project. In this case, the PI and lab continued to work on the project in order to complete the final technical report and at least seven publications. In accordance with 2 CFR220, 85% of the expense was allocable and reasonable to charge to the sponsored agreement. It would have been unreasonable to charge the expense to another award when the sampled award received the majority of the benefit and was the primary reason for the expense.

\$13,697 charged to one award for materials and supplies.

University Response:

The PI received a continuation Cooperative Agreement under award # [REDACTED] Per the General Programmatic Terms and Conditions for the Science of Learning Centers (SLC) Cooperative Agreements [NSF 05-509], which is referenced in the agreements for both awards, "if a Center is successful in application for renewal funding, NSF's funding strategy represents phase support of the project for Years 1 and 2, and full support for Years 3 through 8, with phase down of NSF support of all project activities in Years 9 and 10." NSF considers the two awards one project, therefore the expenses are reasonable and allocable to the award. Specifically, the benefit of each expense is as follows:

AWARDEE RESPONSE

- \$7,332 for the purchase of a microtome, oscilloscope, and automatic knife sharpener.

The microtome, oscilloscope, and automatic knife sharpener were purchased when a nearby institution was liquidated. The microtome is essential for slicing rodent brains at the end of an experiment. This is an appropriate expense for the end of a Cooperative Agreement period, as tissue is frozen and archived to be sliced for three years. The oscilloscope was purchased at 50% of the market cost for experiments proposed in the renewal cooperative agreement. The knife sharpener was necessary to maintain the knife for slicing frozen tissue. The PI acted responsibly by purchasing necessary items for the project at a discounted rate.

- \$3,529 for the purchase of chloroform, dissect blade, kaleidoscope, balance, stirrer/hot plate, and other laboratory supplies

These laboratory supplies were purchased to allow a co-PI to continue to complete research during the approved no-cost extension period.

- \$1,824 for the purchase of a 30" flat panel monitor

The monitor was purchased and placed in the TDLC Motion Capture Facility. The monitor enabled a co-PI's visual motor integration experiments (testing computational models) to proceed. The computational models and simulations provide predictions for subsequent experiments. Available monitors and screens were tested, but the speed and resolution were inadequate to proceed as planned.

- \$1,012 for the purchase of a refrigerator

This purchase was necessary to preserve the rat brain tissue and other histological supplies that are necessary to conduct the neurohistological analysis required by the project. This is an ongoing process.

\$4,704 charged to one award for materials and supplies. Specifically, the following purchases are questioned:

- \$2,793 for giant microbe figures.
- \$1,911 for robot parts.

University Response:

The specified NSF award is part of a larger effort to bring effective interactive technology into early childhood settings. The expense allowed for this continued effort. Although the purchase was made towards the end of the grant, it was used to meet the aims outlined in the original proposal to NSF, which was to make progress on computational problems by developing an integrated system (a child robot) that would learn and develop autonomously a key set of sensory-motor and communicative skills typical of 1 year old infants. These expenses were reasonable, allocable, necessary, and allowable to meet the aims of the award.

AWARDEE RESPONSE

2. Unreasonable Travel

WSB found travel expenses totaling \$54,472 charged to two NSF awards were not necessary or reasonable in accordance with Federal cost principles.

A. \$48,556 for one individual charged to one NSF award. Specifically, the foreign travel expenses questioned are:

- \$16,588 for travel expenses incurred from April 27 to June 22, 2011 while at the [REDACTED] in [REDACTED]
- \$6,671 for travel to [REDACTED] from March [REDACTED] 2011 to attend a conference while on sabbatical.
- \$6,065 for travel to [REDACTED] from March 23 to April 2, 2012 for a conference.
- \$5,710 for travel to [REDACTED] from June 25 to July 11, 2012 to sit on a [REDACTED] committee and for a research visit with an advisor.
- \$4,659 for travel to [REDACTED] from August 31 to September 9, 2012 to attend a workshop from September 3-6, 2012.
- \$4,603 for travel to [REDACTED] from October 13-20, 2012 to attend a three-day workshop
- \$4,260 for travel to [REDACTED] from October 13-23, 2011 to attend a seminar from October [REDACTED] 2011.

B. \$5,916 charged for foreign meals and lodging per diem for a senior personnel on one NSF award.

University Response:

The University does not concur with the auditor's conclusion. Unspent funds were rebudgeted to travel, which was within the University's rebudgeting authority under the Federal Demonstration Partnership (FDP). Although results are published in journals, traveling to conferences is much more important in the computer science community. Presenting at conferences, workshops, etc. is the recognized method for disseminating results in the field. Additionally, these PIs do not normally discuss travel taken in annual or final technical reports. These reports concentrate on the results of the research conducted and do not necessarily include the process (including trips taken) to get to the results.

While we agree that some of the travel expenses may have been submitted untimely, this was not done with malicious intent. For the PI's explanation of each trip's benefit to the award, please see Attachment A.

3. Unallowable Participant Support Expenditures

WSB found \$8,744 charged to two NSF awards unallowable in accordance with Federal cost principles. Specifically, the following participant support expenditures are questioned:

- \$4,744 for travel costs for UCSD employees charged to one award.

University Response:

The University concurs with the auditor's conclusion. The University agrees to refund \$4,744.

AWARDEE RESPONSE

- \$4,000 for social media and marketing services charged to one award.

University Response:

The University does not concur with the auditor's conclusion.

This NSF grant was awarded to fund the [REDACTED]. The workshop was a first, important step towards the development of a set of benchmarks that provide objective measures of the effectiveness of hardware and software systems dealing with big data applications. The social media/marketing activities were essential to creating and maintaining a high level of identity and support for the [REDACTED]. The services included website, outpost, collateral, and workshop activities. These resources were used by the participants before, during, and after the workshop, all of which were designed to contribute to their learning experience. Therefore, these services were meaningful and necessary in support of each participant attending and contributing to the Workshop on Big Data Benchmarking.

4. Unallowable Indirect Costs

WSB found indirect (facilities and administrative) costs totaling \$5,178 charged to one award were unallowable in accordance with Federal cost principles.

University Response:

The University concurs with auditor's conclusion. Corrective action has been performed to remove the unallowable indirect costs from the federal award.

5. Unallocable Visa Immigration Fees

WSB found visa immigration fees totaling \$1,230 charged to one NSF award unallocable in accordance with Federal cost principles.

University Response:

The University concurs with auditor's conclusion. The University agrees to refund \$1,230.

Thank you for the opportunity to respond to the findings that were identified in your audit. If you have any questions related to the response provided, please contact me at 858-534-1334.

[REDACTED]

David Meier
Director
Audit and Management Advisory Services
University of California, San Diego

AWARDEE RESPONSE

Attachment
PI's Response to WSB's Draft Report – Finding 2

The below information annotated in red was provided by the PI in response to Finding 2.

Finding 2 – Unreasonable Travel

Travel expenses totaling \$54,472 charged to two NSF awards were not necessary or reasonable in accordance with Federal cost principles.

We provide ample evidence below that the questioned travel was both necessary and reasonable, indeed essential for conducting the award-relevant research.

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, Appendix A, Section C.3, provides that a reasonable cost is one that a "prudent person would have incurred under similar circumstances."

Any computer science researcher working on the award topic would have been compelled to attend the flagship conferences in their field, as well as the high-quality workshop/seminars relevant to the award topic. Such researchers would have also accepted invitations from world-class experts for research visits relevant to the award.

The necessity of these trips and their benefit to the award are detailed below.

We questioned \$48,556 (\$31,426 plus \$17,130 associated indirect costs) charged to one NSF award for seven foreign travel trips. The following leads us to conclude that the foreign travel trips were not reasonable or prudent for the administration of the award:

- The travel expenses were not approved and charged to the NSF award until one to two years after the travel occurred.

Incidentally, the above statement over-generalizes and does not apply to all questioned travel, leaving out 3 trips out of 8 trips.

Regardless, the reason for delay has a harmless explanation:

At the time of travel and reimbursement, the PI's understanding was that reimbursement for a travel event relevant to an award could be carried out at any time while the award was still active. He submitted the reimbursements when the award expiration date approached, to avoid forfeiture. The delay was not caused by any ulterior motive but simply by the PI's prioritizing reimbursement lower than his research, teaching and service duties. Whenever he would recall the trips, their reimbursement would be set aside in favor of the closest urgent research/teaching/service deadline because the reimbursement deadline had the longest horizon (the end of the award in the PI's knowledge).

- The award was on its second no-cost extension when the travel was approved by UCSD.

AWARDEE RESPONSE

Attachment

PI's Response to WSB's Draft Report – Finding 2

The PI did not plan this travel motivated by any ulterior motive to exhaust remaining funds (as suggested in prior WSB documents). This is evident from the fact that all late reimbursements involved trips that occurred two or more years prior to the grant's end, with the exception of one that took place 1 year and 11 months before the grant's end (the [REDACTED] workshop in September 2012) and one that took place 1 year and 10 months before the end (the [REDACTED] [REDACTED] in October 2012). Note that all but the latter two trips occurred before the NCE period of the grant even started, and none occurred during the second NCE year.

Late reimbursement was also not due to any last-minute decision of spending down excess funds after initially planning to not reimburse at all (also suggested by WSB's additional questions document). It does not make sense that the PI would have deliberately planned not to reimburse travel he paid out of pocket given that the funds were available and that the travel was relevant to the award

- No travel was requested in the NSF award budget, but 14 percent of the award budget was rebudgeted for travel.

The initial budget reflects the best-case scenario of success in recruiting graduate student researchers for the project (which did not occur). It does not reflect the eventuality of a graduate student leaving early for a full-time position in industry (which did occur).

The questioned travel amounts not to 14% but to 5.2% (direct costs, 8% including indirect costs). Both total and questioned travel lies well within the FDP-allowed 25% rebudgeting limit.

- The funds spent on travel were originally budgeted to fund graduate student researchers.

Funding graduate student researchers remained the top priority of the award. No existing graduate student researchers lost funding to travel reimbursement. Travel was reimbursed only from funds that could not be allocated for graduate student researchers despite recruiting efforts.

- The travel was not mentioned in the annual reports or the final report.

It is not common practice for reports to mention travel. The reports focus on the research results, not on the process (including travel) leading to them.

- The lack of a clear benefit and necessity to the award for any of these trips.

The necessity and benefit are detailed below for each individual trip.

We summarize here by noting that the research field of computer science is unique in that conference, workshop and seminar publications are the main form in which scientific results are disseminated (this is in contrast to other fields where journal publications are the main dissemination form). Conferences have a broad focus, covering all topics of the discipline, while workshops/seminars specialize on a small selection of topics.

AWARDEE RESPONSE

Attachment
PI's Response to WSB's Draft Report – Finding 2

Therefore, attending the relevant and prestigious conferences/workshops/seminars in one's field is essential for carrying out cutting-edge computer science research; this is where researchers educate themselves on the latest developments in the state of the art, disseminate their own results, and receive feedback on their approaches from leading experts in the field.

Human resource development is equally inconceivable without attending these venues, as this is where research advisors introduce their graduate students to the community, helping them develop essential skills in presenting their results formally and discussing research informally. These skills, coupled with the relationships to other leading researchers established through in-person meetings at the venue, contribute to the employment of the graduate students upon graduation.

All of the PI's conference/workshop/seminar trips were to venues that are relevant to the research on the award. Information detailing the specific value provided by each of these conferences to the PI's award-relevant research was provided to the WSB audit team under separate cover.

In addition, all these venues are top-notch in terms of prestige as well as the quality of the research contributions and of the attendance they attract:

- [REDACTED] 2011 trip) is the flagship conference in database systems research,
- The [REDACTED] 2011 and [REDACTED] 2012) is top-tier in database theory research,
- the [REDACTED] workshop [REDACTED] 2012) was an invitation-only workshop that was organized by topmost researchers in the field and gathered the "best world specialists in the topic", according to the workshop Website at [http://www.\[REDACTED\]](http://www.[REDACTED])
- [REDACTED] seminars ([REDACTED] 2011) are famously held in a forum that facilitates research interaction. The venue has limited capacity, participation is by invitation-only, and only the world's leading researchers in each seminar's topic are invited.
- The [REDACTED] 2012), besides gathering leading experts in the field of data-centric processes, was co-located with the prestigious [REDACTED] conference.

It should also be noted that the PI did not attend any of the above as a regular attendant, even though doing so would have been perfectly reasonable and necessary to his research on this award (for education, dissemination and scientific discussions). The PI was an active participant, connected to each forum via a significant contribution that required attendance: he had research papers presented at [REDACTED] 2011 and [REDACTED] 2011 (acceptance at these conferences is highly selective and a great success), was the Program Committee Chair of [REDACTED] 2011 (a great honor that comes with the duty to attend), gave an invited talk at the [REDACTED] workshop (also an honor given who launched the invitation and whom else was invited), was a co-organizer of the [REDACTED] 2011 seminar (a highly visible function that honors its performers) and gave an invited keynote talk at the [REDACTED] 2011 workshop (keynote talks are honors attesting to the speaker's expertise).

The questioned travel also includes three trips for research collaboration, during a sabbatical quarter or during the summer session. This kind of trip is equally important, for the fundamental reason that in certain stages of research collaborations, in-person interaction in the form of informal technical discussions is essential.

AWARDEE RESPONSE

Attachment
PI's Response to WSB's Draft Report – Finding 2

Information was provided to the WSB audit team under separate cover demonstrating that the topics of the technical discussions were aligned with the award, and the discussion partners are world-class experts on these topics.

The actual travel occurred between March 2011 and October 2012. Of the seven trips, four of the travel expense forms were dated August 2013 and three were dated June 2013, which was 1 to 2 years after the travel occurred.

Per UCSD, these reimbursements were not submitted timely because they were set aside in favor of conducting more productive (and urgent) work activities in research, teaching, and service. The reimbursements were submitted when it was recalled and realized that the reimbursements would be forfeited once the award expired.

UCSD travel policies require travel expense claims be submitted 45 days after the end of a trip, travel reimbursement requests submitted after 45 days are left to the discretion of the campus.

At the time, the PI was unaware of this policy, and of any time limit on submitting reimbursements. He found out about it from this report. The PI was unaware of any communication or enforcement of this policy by campus prior to January 2015, when a reimbursement window of 21 days was announced to faculty. Note that all questioned trips were reimbursed prior to 2015.

Independently of this fact, campus did exercise its discretion and approved the trips.

Per UCSD, the referenced travel events were approved because they were deemed by the travel office to be reasonable, prudent, and relevant to advancing the work under the sponsored agreement and within its project period. However, not only were the travel expense claims not approved timely (1 to 2 years after the travel occurred), but also the award was on its second no-cost extension when the travel was approved by UCSD.

The PI's understanding at the time was that travel events performed in service of an award were reimbursable at any time before the expiration of the grant and thus felt no pressure to act. He found out only from this WSB report about the 45-day deadline.

It is not reasonable that the \$31,426 in unsubmitted travel reimbursements were not mentioned in either of the two no-cost extensions filed after the travel was taken.

The no-cost extensions focused on the proposed future research, not on the travel carried out in support of the research. The PI was unaware of any expectation to mention travel, particularly past travel (all but two trips had taken place by the start of the first NCE year, and the latter two had taken place almost a year before the start of the second NCE year).

Additionally, the NSF award budget did not include travel.

The initial budget reflects the best-case scenario of success in recruiting graduate student

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researchers for the project (which did not occur). It does not reflect the possibility of a graduate student leaving early for a full-time position in industry (which did occur).

The cumulative NSF award budget was \$599,765. During our audit period, we noted \$87,478 in travel costs charged to this NSF award; this represents 14 percent of the cumulative award budget.

The questioned travel represents 8% (including indirect costs; 5.2% direct costs). Both questioned and total travel lie well within the FDP-allowed re-budgeting limit.

Per UCSD, given the budget limit for the solicitation and the growing lab, UCSD wanted to fund as many graduate student researchers as possible. UCSD anticipated receiving unrestricted gift monies to fund the project's travel expenses. Thus, three students and zero travel dollars were budgeted into the project.

The above paragraph explains why the initial budget did not include travel. Note that the initial budget reflects the best-case scenario of success in recruiting graduate student researchers for the project (which did not occur). It does not reflect the possibility of a graduate student leaving early for a full-time position in industry (which did occur).

At the time of the award, only two qualified students were available to work on the project, so the unused student salary was reallocated for travel.

Given the significant delay (usually 6 months) between proposal submission and its selection for funding (never a certainty), as well as the additional delay (often another 2 months) until the funds arrive, proposals are always budgeted on the number of students the PIs hope to recruit once (and if) the proposal is approved, not on the number of students available at proposal submission time.

The outcome of recruitment is subject to uncertainty pertaining to the availability of qualified students interested in the project. There is also uncertainty in retaining recruited students (for instance one of the involved students left early for a position at a tech company). This kind of uncertainty is precisely why the limited FDP rebudgeting mechanism is built into the award in the first place.

We tested \$62,705 of these travel costs and questioned \$48,556 in foreign travel expenses for one individual charged to the NSF award:

- \$16,588 for travel expenses incurred from April 27 to June 22, 2011, while at the [REDACTED] in [REDACTED]

The stay at [REDACTED] ended June 11, when the PI left for the [REDACTED]

Airfare and per diem were charged to the NSF award while at the [REDACTED] [REDACTED] however, neither the travel, nor the collaboration with the [REDACTED] was mentioned in the annual report.

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The report confined itself to publishable/published results, which were not yet produced by the end of the visit. The visit however provided an opportunity for numerous discussions that led to the further project-relevant education of the PI. Some of these discussions came to fruition in later works.

In particular, the PI educated himself on some of the main ideas he would end up employing in the [REDACTED] paper reported in this award. This education was due to the PI's many discussions with two [REDACTED] Professors (as well as their students and postdoctoral researchers). Both professors are world leaders in the topic of speeding up queries by exploiting pre-computed data sets (the topic of the [REDACTED] paper, and an important objective of the award).

The technique employed in the [REDACTED] paper is that of reformulating the original query into one that takes advantage of the precomputed data, by using a rewriting procedure called "the chase". One professor is an expert in chasing queries with constraints when these are expressed in a specific language called Description Logic. While the [REDACTED] paper targets a different language than Description Logic, there are interesting similarities and distinctions between the two language settings, which the PI and the Prof. explored in their discussions. They also discussed the speed-up of queries over graph data (the Prof. is one of the pioneers in this field). This is relevant to the award because XML data (a particular emphasis of the award) is a special case of graph data. The discussions with the other Professor focused on another aspect of this objective of speeding up queries, namely the ramifications of set versus bag semantics of queries, as well as the presence or absence of null values. All of these are highly relevant to the practical query optimization settings targeted by the award.

There were also charges to attend a conference in [REDACTED] from June [REDACTED] 2011. The travel expense form was dated August 12, 2013; more than 2 years after the travel occurred.

Please see above explanation addressing late reimbursement.

The conference trip was relevant to this award for several reasons.

First, it afforded the PI the opportunity to educate himself on the state of the art in research on the topics of large-scale distributed query processing in general and XML processing in particular (including both querying the structure of XML documents via declarative query languages, and their text via full-text-style keyword search). These are main objectives of the award. [REDACTED] is the flagship conference on database systems research and it attracts the leading researchers in the field. A list of samples of talks/tutorials on these very topics, which were presented at this conference and which the PI personally attended and/or discussed with the authors, was provided by the WSB audit team under separate cover. The document also details the world-class research expertise of the involved authors. Not only did these discussions help clarify the PI's understanding of the presented works, but they also afforded the opportunity to receive feedback and advice on the research approaches considered by the PI in pursuing the award's objectives, and to explore collaboration opportunities.

Second, the following paper co-authored by the PI and presented at this conference was the direct result of research on this award, and was included in the award's report. The report does

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not mention the travel because it focuses on the published/publishable results, including this paper. Its presentation contributed to disseminating the results of this very project.

Third, attending this conference also served the purpose of human resource development, as the PI introduced his graduate students to the community, towards networking for future employment. This applies in particular to one of the PhD student funded by this award and co-author of the paper mentioned above. The introduction led to many fruitful discussions between the PhD student and leading researchers interested in the topic of ranking results of full-text search queries over XML data, and of optimizing such ranked queries while preserving the ranking scores. These helped train the PhD student in presenting his own work and learning from peers. It also contributed to his eventually securing a full-time position at a tech company. (Unfortunately, he left for full-time employment at the tech company before graduating, which contributed to not spending all initially budgeted graduate student support of the award).

- \$6,671 for travel to [REDACTED] from March [REDACTED] 2011, to attend a conference. The travel expense form was dated August 12, 2013; almost 2.5 years after the travel occurred.

Please see above explanation addressing late reimbursement.

This particular conference was relevant to the award due to the contents of its technical program, as well as due to its premier status, ensuring that it attracts the leading researchers in the PI's field. The conference joins the [REDACTED] and the [REDACTED] conferences (these joint conferences are held as a single large event, and the registration covers attendance of both conferences). [REDACTED] attracts the leading database theoreticians, while [REDACTED] attracts leading database systems researchers. The research conducted by PI [REDACTED] for this award targeted both the theoretical and systems challenges in developing new database technology, making the conference the perfect forum for the PI to educate himself on the state of the art in theoretical and systems research on large-scale distributed query processing in general and XML processing in particular (including both querying the structure of XML documents via declarative query languages, and their text via full-text-style keyword search). These are main objectives of the award.

A list of samples of talks/tutorials on these very topics, which were presented at this conference and which the PI personally attended and/or discussed with the authors, was provided to the WSB audit team under separate cover. The document also details the world-class research expertise of the involved authors.

Not only did these discussions help clarify the PI's understanding of the presented works, but they also afforded the opportunity to receive feedback and advice on the research approaches considered by the PI in pursuing the award's objectives, and to explore collaboration opportunities.

- \$6,065 for travel to [REDACTED] from March 23 to April 2, 2012, for a conference. The conference was from March [REDACTED] 2012. The travel expense form was dated August 12, 2013; almost 1.5 years after the travel occurred.

Please see above explanation addressing late reimbursement.

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The conference is the flagship [REDACTED] Prof. [REDACTED] served as its Program Committee Chair, the highest conference officer role. Being invited to chair the conference is a great honor that comes with the duty to attend.

The benefit of this travel to the award is detailed next.

First and foremost, it afforded the PI the opportunity to educate himself on the state of the art in research on large-scale distributed query processing in general and XML processing in particular (including both querying the structure of XML documents via declarative query languages, and their text via full-text-style keyword search). These are main objectives of the award. Due to its premier status, this conference attracts the leading database researchers. The conference joins the [REDACTED] and the [REDACTED] [REDACTED] conferences (these joint conferences are held as a single large event, and the registration covers full attendance of both conferences). [REDACTED] attracts the leading database theoreticians, while [REDACTED] attracts leading database systems researchers. The research conducted by PI [REDACTED] for this award targeted precisely the theoretical and systems challenges in developing new database technology, making the conference the perfect forum for the PI to educate himself.

A list of samples of talks/tutorials on these very topics, which were presented at this conference and which the PI personally attended and/or discussed with the authors, was provided to the WSB audit team under separate cover. That document also detailed the world-class research expertise of the involved authors.

Besides helping clarify the PI's understanding of the presented works, these discussions also afforded the opportunity to disseminate this award's preliminary results and receive feedback and advice on the research approaches considered by the PI in pursuing the award's objectives, as well as to explore collaboration opportunities.

- \$5,710 for travel to [REDACTED] from June 25 to July 11, 2012, to sit on a [REDACTED] committee and for a research visit with an advisor. The travel expense report was dated June 11, 2013; 1 year after the travel occurred.

Please see above explanation addressing late reimbursement.

Invitations to thesis defense committees are an honor attesting to the invitee's expertise in the field.

Both the topic of the thesis and that of the research visit were aligned with the award's objectives, as detailed below.

The reason for travel were discussions in view of starting a collaboration on speeding up queries by rewriting them to best exploit pre-computed data. One of the individuals who the PI collaborated with is a leading researcher in this domain, with particular focus on the case of queries over XML data. The thesis of one other collaborator focuses on precisely this topic. Another collaborator was invited to sit on the thesis committee due to his own expertise on the topic. This travel benefited the award as the topic of rewriting queries using pre-computed data is a key topic addressed in the grant.

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As an aside, the collaboration started during this trip was of long-standing and fruitful nature. It eventually led to the official establishment of an INRIA associated research team between the labs of two of the individuals with who the PI collaborated on this trip. The associated team's work led to three published papers on the very topic of query speed-up via pre-computed data.

- \$4,659 for travel to [REDACTED] from August 31 to September 9, 2012, to attend a workshop from September [REDACTED] 2012. The travel expense report was dated June 4, 2013; 9 months after the travel occurred.

Please see above explanation addressing late reimbursement.

The trip was undertaken in response to an invitation by the workshop organizers to give an invited talk (see the following link for the workshop program: [http://www.\[REDACTED\]](http://www.[REDACTED])). Invited talks are honors attesting to the speaker's expertise and renown in the field. They come with the duty to attend.

The trip was beneficial to the award because it served both the purpose of disseminating results and that of educating the PI on latest developments in the field of large-scale distributed data-centric processes (a key topic of the award). A list of samples of talks/tutorials on this very topic, presented at this workshop and which the PI personally attended and discussed with the authors, was provided to the WSB audit team under separate cover. That document also details the world-class research expertise of the involved authors.

Besides helping clarify the PI's understanding of the presented works, these discussions also afforded the opportunity to disseminate this award's preliminary results and receive feedback and advice on the research approaches considered by the PI in pursuing the award's objectives, as well as to explore collaboration opportunities.

- \$4,603 for travel to [REDACTED] from October 13-20, 2012, to attend a three-day workshop. The travel expense report was dated June 4, 2013; 7 months after the travel occurred.

Please see above explanation addressing late reimbursement.

The reason to attend this trip was to give an invited talk in the workshop dedicated to processing large-scale data, which is a main research objective of the award. This was an invitation-only workshop, organized by topmost researchers in the field and attracting only leading researchers ("best world specialists in the topic", according to the workshop Website at [http://www.\[REDACTED\]](http://www.[REDACTED])). Being invited was an honor that came with the duty to attend.

The trip was beneficial to the award as it served both the purpose of disseminating the award's results and that of educating the PI on latest developments in the field of querying large-scale distributed data, with particular emphasis on XML data (these are key topics of the award).

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With respect to dissemination, the talk given by the PI was a preview of his (at the time) in-progress work on chasing queries for the purpose of speeding them up using pre-computed data sets. See workshop program at <http://www.> [REDACTED] The full results were eventually published in [REDACTED] and reported in this award. They incorporated valuable feedback the PI had received in discussions with the workshop attendants.

With respect to the PI's education, a list of samples of talks on querying large-scale distributed data, with particular emphasis on XML data (key topics of the award), which were presented at this workshop and which the PI personally attended and discussed with the authors, was provided to the WSB audit team under separate cover. The document also details the world-class research expertise of the involved authors. The focused, selective and invitation-only nature of the workshop was particularly conducive to in-depth discussions on this topic.

Besides helping clarify the PI's understanding of the presented works, these discussions also afforded the opportunity to disseminate this award's preliminary results and receive feedback and advice on the research approaches considered by the PI in pursuing the award's objectives, as well as to explore collaboration opportunities.

- \$4,260 for travel to [REDACTED], from October 13-23, 2011, to attend a seminar from October [REDACTED] 2011. The travel expense report was dated August 12, 2013; almost 2 years after the travel occurred.

Travel was not to [REDACTED] but to [REDACTED].

Please see above explanation addressing late reimbursement.

The PI attended the [REDACTED] seminar in his capacity as co-organizer of this event. It is a great honor to serve as [REDACTED] organizer, as only the leading researchers in the field attend the seminar. This honor comes with the duty to attend, making the trip necessary. The trip was beneficial to the award since the seminar's topic was "Foundations of Distributed Data Management". The topic of distributed data management was precisely aligned to the topic of the award (and the reason PI [REDACTED] co-organized the event). Indeed, the [REDACTED] prototype this award built is precisely a platform for large-scale distributed data management. The foundational nature of the seminar refers to the theory underlying distributed data management. This is directly relevant to the award as its contributions address both the theoretical and systems-building challenges of distributed data management.

The PI used the opportunity to educate himself on the latest developments in this area, and to disseminate results of the award, via discussions with the attendants. A list of researchers with world-class expertise in this field, and whose presentations the PI attended in person, taking the opportunity to discuss with the authors (these discussions are particularly well facilitated at [REDACTED] seminars due to the deliberately selective audience hosted in a remote location for an entire week), was provided to the WSB audit team under separate cover. Not only did these discussions help clarify the PI's understanding of the presented works, but they also afforded the opportunity to disseminate the PI's own results in this award, to receive feedback and advice on the research approaches considered by the PI in pursuing the award's objectives, and to explore collaboration opportunities.

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Additionally, we questioned \$5,916 charged for foreign meals and lodging per diem for a senior personnel on one NSF award. The travel occurred from June 27 to August 27, 2013. The award expired on August 31, 2013.

This travel was directly relevant to award [REDACTED] for which the Professor served as co-PI. The PI of the award was away from UCSD while on sabbatical at [REDACTED]. During this time, the PI and co-PI needed to collaborate on their ongoing research on the automatic verification of data-centric processes, in particular those specified using business artifact systems as introduced by IBM (a key focus of award NSF [REDACTED]). In-person collaboration was more efficient than remote collaboration, and it was especially needed during the final phase of the award. Since the co-PI was also visiting France for a collaboration relevant to grant NSF [REDACTED] this afforded the PI and co-PI the opportunity to collaborate in person. During his visit, the co-PI split his time between the two projects (hence the split funding of reimbursements).

There was no travel in the NSF award budget and there was no mention of the travel in the final report.

The award is FDP, allowing rebudgeting for travel within the FDP threshold without prior approval from NSF. The final report focuses on detailing published final results, not on the travel involved in reaching them. The collaboration between the PI and co-PI of the same award on conducting award-relevant research and finalizing the award is necessary and self-understood.

OBJECTIVES, SCOPE, AND METHODOLOGY

The audit objective was to determine whether the costs claimed complied with NSF award terms and conditions and Federal financial assistance requirements. Our audit included assessing the allowability, allocability, and reasonableness of costs claimed by UCSD through the Award Cash Management Service for the 3-year period beginning April 1, 2012, through March 31, 2015. The audit was performed in accordance with *Government Auditing Standards* for performance audits.

To aid in determining reasonableness, allowability, and allocability of costs, we obtained from UCSD all award transactions comprising all costs claimed to NSF during the period of April 1, 2012, through March 31, 2015. This provided an audit universe of approximately \$197 million, in approximately 252,000 transactions, across 708 individual NSF awards. For transaction testing we judgmentally selected 286 transactions totaling \$2.5 million and utilized a data analytics approach to identify potential risk areas. We also performed additional, non-transaction based tests as we deemed necessary.

Our work required reliance on computer-processed data obtained from UCSD and NSF. At our request, UCSD provided detailed transaction data for all costs charged to NSF awards during our audit period. 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 UCSD 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 UCSD by: 1) comparing costs charged to NSF award accounts within UCSD's accounting records to reported net expenditures, as reflected in UCSD'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 UCSD used to extract transaction data from its accounting records and systems.

Based on our testing, we found UCSD 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 and 2015 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 UCSD, we also gained an understanding of the internal controls applicable to the scope of this audit through interviews with UCSD, review of policies and procedures, and conducting walkthroughs as applicable.

We assessed UCSD's compliance with the University's 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* (OMB 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* (OMB Circular A-110);

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- 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.

Questioned Cost Summary by Award

Award ID	Amount Questioned	Overhead Questioned	Total Questioned
Finding 1 – Unreasonable Equipment, Materials, and Supplies Purchases			
██████████	\$ 158,940	\$ -	\$ 158,940
██████████	8,866	4,831	13,697
██████████	3,044	1,660	4,704
██████████	5,398	2,942	8,340
██████████	6,629	-	6,629
██████████	3,279	1,787	5,066
██████████	2,618	1,426	4,044
██████████	2,158	1,176	3,334
██████████	1,341	730	2,071
██████████	1,341	730	2,071
██████████	1,275	695	1,970
██████████	1,025	559	1,584
██████████	696	380	1,076
██████████	651	-	651
Finding 1 Total	197,261	16,916	214,177
Finding 2 – Unreasonable Travel			
0910820	31,426	17,130	48,556
0916515	3,829	2,087	5,916
Finding 2 Total	35,255	19,217	54,472
Finding 3 – Unreasonable Participant Support Expenditures			
██████████	4,744	-	4,744
██████████	4,000	-	4,000
Finding 3 Total	8,744	-	8,744
Finding 4 – Unallowable Indirect Costs			
1305427	-	5,178	5,178
Finding 4 Total	-	5,178	5,178
Finding 5 – Unallocable Visa Immigration Fees			
██████████	796	434	1,230
Finding 5 Total	\$ 796	\$ 434	\$ 1,230