

**National Science Foundation  
Advisory Committee for Business and Operations  
Fall 2019 Meeting Minutes  
December 9-10, 2019**

**Attendance:**

Robert Dixon	Interim Chair of the Department of Industrial and Systems Engineering, North Carolina Agricultural and Technical State University
Charles Grimes (co-chair)	Retired, COO, U.S. Office of Personnel Management
Michael Holland	Vice Chancellor for Science Policy and Research Strategies, University of Pittsburgh
Ned Holland	Retired, Assistant Secretary for Administration, U.S. Department of Health and Human Services
Jan Jones	Retired, Federal Senior Executive, United States Capitol Police
John Kamensky	Senior Fellow, IBM Center for the Business of Government
Alicia Knoedler	Director of Team Innovation, Exaptive, Inc.
Rachel Levinson	Executive Director, National Research Initiatives, Arizona State University
Joe Mitchell	Director of Strategic Initiatives, National Academy of Public Administration
Kim Moreland	Associate Vice Chancellor, Director, University of Wisconsin - Madison
John Palguta	Retired, Vice President for Policy, Partnership for Public Service
Susan Sedwick (co-chair)	Senior Consultant, Attain, LLC
Pamela Webb	Associate Vice President for Research, University of Minnesota
Doug Webster	Retired, Chief Financial Officer, US Department of Education

**Welcome and Introductions**

On Monday, December 9, Co-Chair Chuck Grimes welcomed the members, noting that Tilak Agerwala, Ben Brown, Lee Cheatham, Rachel Levinson, Theresa Pardo, and Adam Goldberg were unable to attend and that Mike Holland, Jan Jones, John Palguta, Susie Sedwick and Doug Webster were completing their second terms on the BOAC. Chuck reminded discussants to please share their notes with Susie and him for incorporation into the minutes. He also thanked the NSF staff for the excellent job they did in planning the meeting.

**Updates: BFA; OIRM; Budget/OLPA**

BFA: Since Teresa Grancorvitz was unable to attend, Janis Coughlin-Piester, BFA, provided the updates, starting with announcing staffing changes in BFA. The financial audit was completed with no findings. The IG removed an audit finding on improper payments. The emerging issue from last year regarding Foreign Government Talent Recruitment Programs is now a challenge. Additional emerging challenges discussed were enterprise-wide internal controls, increased emphasis on interagency collaboration and the transition to G-invoicing which will need to be used for all interagency reimbursements and

payments. She also mentioned that the Unique Entity Identifier owned by the Federal government will be replacing DUNS identifiers in December 2020.

OIRM: Wonzie Gardner announced staffing changes in OIRM and technology improvements that provide greater access to information on NSF. Water stations have been installed in multiple locations to cut down on the use of single-use water bottles. Metro shutdowns posed a significant challenge but were so well-managed that no complaints were received, and the communication strategy will be used as a model going forward. AV touch screen panels are being installed throughout the facility. Modern resilient IT security upgrades will help facilitate remote work while assuring information security. NSF has received multiple awards and recognition of its IT systems and IT security.

Caitlyn Fife, BFA, provided an update on the Federal budget, and Amanda Greenwell, OLPA, provided an update on legislative issues.

### **Results from the 2019 Federal Employee Viewpoint Survey (FEVS)**

Presenter: Pat Curtin, Lauren Forgacs, OIRM

Discussant: John Palguta

Pat Curtin and Lauren Forgacs reported on the NSF findings from the Federal Employee Viewpoint Survey (FEVS). FEVS is an annual measure of NSF staff's perception of the workplace across several dimensions. Each year, all staff are invited to share their perspectives on their work unit, supervisor and leadership, and NSF culture. FEVS results are a major input into employee engagement action planning by each directorate and office.

NSF staff are invested in the employee engagement process, as evidenced by the 71% response rate on the FEVS, compared to the government-wide average of 43%. NSF has achieved four years of sustained improvement across all the engagement areas of focus – career development; performance and recognition; workload; and inclusion. In 2019, the score on the workload index went down one point.

OIRM continues to build out resources that support the directorates and offices as they work to improve engagement. Along with providing full transparency on all NSF FEVS results, they have incorporated a module on effective employee engagement strategies in the Federal Supervisor training course, published a curated engagement website with resources touching many topics, facilitated a managers' brownbag discussion on employee morale and engagement, and provided consulting support to the directorates and offices.

John Palguta presented an overview of the FEVS results for NSF, noting that every year since 2012, the NSF FEVS results have shown an increase in employee engagement and employee satisfaction compared to the prior year. In 2019, the governmentwide average score on OPM's Employee Engagement Index was 68. NSF's employee engagement score is 77. In 2019, 71.2 percent of all NSF employees responded – a very high response rate for this type of survey. In 2019, only 4 out of 17 mid-sized agencies had a higher response rate while 12 had lower response rates – including one (FCC) in which less than 40 percent responded. Finally, the Best Places to Work (BPTW) rankings issued by the Partnership for Public Service will be released next week. Last year, NSF ranked number 8 out of 27 mid-sized agencies.

It is important to note that during this time period (2012 – 2019), the NSF experienced a major move to a new location and new building, a change of presidential administrations, and the longest government

shutdown in history. To have improved during all of this is a real achievement. These positive results and the positive trend since 2012 are not accidental. NSF leadership, management, and employees have all worked hard to improve the work environment and engage employees. It is unfortunate that Dr. Córdova cannot be here for this meeting because she certainly deserves credit for the positive trends during her almost 6-year term which will end in March 2020. It is no accident that NSF employee responses to the question “My organization’s leaders maintain high standards of honesty and integrity” increased by almost 15 points between 2015 and 2019 – a very significant increase over a four-year period.

Turning to the road ahead, NSF will have challenges and opportunities as it attempts to not only sustain the progress made but to continue to improve. The departure of Director Córdova is one such challenge. Leadership is among the major drivers of employee satisfaction and engagement, and senior leadership has a particularly large impact in small and mid-sized agencies. Acting leadership and the next Director should continue the focus on the connection between the mission and workforce engagement that has been evident over the last six years. Follow-through on NSF’s “engagement action planning” process will be very important. Opportunities to improve employee engagement include continued solicitation of employee feedback on opportunities for improvement throughout the year, not just during the annual FEVS, and continued involvement of employees in developing solutions to emerging issues such as workload imbalances. It is also important to continue to carefully select and train first line supervisors – a key link in employee engagement. Training and support in the area of effective communication can be especially important, too. Finally, it is important to recommend that becoming a top five Best Place to Work agency in 2020 (among mid-sized agencies) be an explicit short-term goal for NSF.

#### Committee Action/Feedback Discussion:

1. What promising practices have you seen organizations like NSF use to sustain incremental improvements in engagement over time, or to stimulate more significant boosts to engagement?
2. NSF has a workforce with a diverse set of people and life experiences. How have you seen organizations successfully integrate STEM and non-STEM staff working side-by-side on the same mission?
3. NSF has made progress on improving methods to help NSF staff deal with their workload. However, NSF still sees a need to help staff better manage their growing workload given current resources, time, new technology, etc. In today’s climate of “do more with less”, how have you seen organizations or workforces successfully deal with increasing workplace demands when staff already see their workload as being difficult to complete?

Regarding the first question, John Palguta noted that NASA is very good at improving employee engagement, and recommended a field visit to NASA. Ned Holland noted that increased response rates provide better results. John Kamensky suggested looking at organizational response rates, then addressing the lowest organizations. John Palguta suggested that linking actions taken to the survey results, running promotional events, and getting the buy-in of first level supervisors can help increase the participation rate. An 85% response rate is an achievable goal.

Regarding the second question, Joe Mitchell noted that NAPA has a paper on science versus HR staff issues and offered to send it over. Wonzie Gardner noted that NSF has a one team one fight outlook, which served NSF well during the 35-day government shutdown.

In response to the third question, John Palguta noted the futility of “do more with less” – the phrase should be recast as doing less with less, doing differently with less, or what can you stop doing or do less of. BOAC members suggested three things to consider: 1) look at how to automate menial tasks to lessen workload, 2) take a critical look at processes, and 3) engage division by division on workload issues rather than holding out to the entire NSF that the workload problem can be solved.

### **Balancing Mission, Risk and Compliance**

Guest Speaker: Robert Shea, Principal, Public Sector Practice, Grant Thornton

Moderator: Alex Wynnyk, BFA

Panelists: Mark Bell, OIG; Fae Korsmo, OD

Discussants: John Kamensky, Doug Webster, Mike Holland

In July 2019, the Bipartisan Policy Center’s Task Force on Executive Branch Oversight published a report entitled “Oversight Matters: Balancing Mission, Risk and Compliance.” One of the Task Force’s members, Robert Shea, provided an overview of the report’s observations and recommendations. Shea noted a growing concern that extensive oversight activities decrease mission performance and increase non-value-added activities. The Task Force examined the current state of oversight, noted effective practices, and made recommendations to help improve Federal agency focus. The Task Force suggests that agencies eliminate compliance for compliance’s sake and focus instead on risk-based, data-driven compliance policies.

The report provided 11 recommendations for agency leaders, external oversight bodies (for example, inspectors general, the Governmental Accountability Office), the Office of Management and Budget, and Congress. Key recommendations for agency leaders and external oversight bodies include:

- Agency leaders should reduce the time they spend on compliance-related activities and dedicate more time to mission performance.
- Agency leaders should consider collecting proxy or qualitative data on the cost/benefits of time spent on compliance versus performance activities.
- Agency leaders should collect more robust measures of mission performance and analyze with risk measures to better identify root causes of risk.
- Agency Leaders should consult with and seek guidance from external oversight bodies.
- Agency leaders should define and adopt cultures that report and address risk.
- External oversight bodies should refocus oversight practices to include more mission-related values and outcomes in addition to the traditional emphasis on fraud, waste, and abuse.

Committee Action/Feedback Discussion:

1. Assess the applicability of the report’s recommendations in the NSF environment.
2. Gauge NSF’s status against these recommendations as to where NSF is performing well and where NSF has opportunities to improve.
3. Identify areas that NSF should explore.

John Kamensky noted that universities get \$75 billion in research funds annually, and about \$8 billion of that comes through NSF. Since 1991, there have been more than 100 new activities and associated oversight and administrative costs, and now as much as 44% of a Principal Investigator’s research time is spent on grants administration. In 2014, OMB consolidated multiple administrative circulars to try to reduce the administrative burden. But inconsistent interpretation of this uniform guidance among

inspectors general, agencies, and universities, coupled with the risk-averse nature of universities, blunted the potential of the consolidated circulars to reduce burden.

NIH has implemented fixed grant program limits to try to reduce the program administrative oversight burden. Given that NSF's average award is \$177K, perhaps NSF should try fixed grant programs like NIH. Alex Wynnyk noted some fixed awards would require pre-award reviews, with an even higher burden.

Doug Webster expressed his agreement with most of the report, but noted that the focus should be on stakeholder value, rather than simply mission performance, e.g.: *results* – What am I going to do for you; *return* – resources needed; and *risk* – the balancing act between stewardship and results.

Mike Holland emphasized the importance of return on value and suggested an oversight incentive structure to address the problem of excessive oversight. Pamela Webb agreed, noting that the addition of more oversight does not result in adding more value, and lack of stakeholder input compounds the problem. Susan Sedwick noted that universities have entrenched effort reporting systems that work for them, and they are reluctant to change. This leaves the burden with grantees, which Fae Korsmo noted was a dangerous and constant challenge. Kim Moreland pointed out that changing to a new system is risky, and that administrative costs continue to increase, not decrease. John Kamensky asked if fixed grants might be useful at NSF. Moreland noted that university effort reporting systems would need to be changed in view of changed uniform guidance, further increasing risk to risk-averse universities. The real issue is return on investment – a recent audit cost \$250,000 but resulted in only \$120,000 paid back to the university. She agreed, noting that eliminating oversight is not the point, but asking if oversight is the right place to put resources is the point.

### **Meeting with Dr. Crim**

Upon Dr. Crim's arrival, introductions were given around the table. Dr. Crim noted that Director Córdova sends her regrets as she is traveling to Antarctica along with stakeholders (OSTP) and others from the community. Dr. Córdova has been traveling frequently including to meetings with the Arctic Circle Assembly, to view projects in Chile, and to the World Science Forum in Hungary. Dr. Crim reminded the BOAC that next year is the 70<sup>th</sup> anniversary of NSF and noted that President Truman signed legislation establishing NSF in 1950. Emily Gibson is currently updating NSF's history in a new book that includes updated stories and great vignettes that will be published next year with a foreword by Dr. Córdova. This will be the first history published since NSF was 25 years old. The NSF's 70th Anniversary Symposium will be February 6-7, 2020, which will kick off a year-long commemoration of NSF's 70th anniversary, and 75 years since the publication of "Science - the Endless Frontier," written by Vannevar Bush, a man who helped establish the formation of NSF.

On the budget outlook, the fiscal year 2019 budget was 8.1 billion, and the pending 2020 budget of \$7.1 billion reflects presidential priorities. However, there are NSF budget bills for \$8.6 billion in the House and \$8.3 billion in the Senate. The 2021 budget request is at OMB and is being discussed. On December 20, 2019, the continuing resolution ends, and BFA is planning for potential shutdown.

NSF has completed search for new CISE AD. Dr. Margaret Martonosi will serve as head of the NSF CISE Directorate, and will begin her tenure at NSF on February 1. NSF has charged ahead with convergent accelerators science proposals and is in the process of making midscale research awards (three of which are design awards). NSF will engage the community on the topic of science and security in the face of

international competition and is clarifying policy on disclosing all kinds of support with a proposed review of classified and unclassified support.

Regarding the agenda, NSF FEVS scores continue to improve, and workload is still a problem. Dr. Crim gave a talk to NSB regarding research in the context of administrative burden, noting that building requirements increase administrative burden. Compliance versus administrative burden is a good conversation for BOAC to have. The first graduation of NSF's Leadership Development program is Thursday, and renewing NSF efforts continue under the leadership of Dorothy Aronson. Dr. Crim thanked the BOAC for its work and reiterated that advisory committees are essential to what NSF does. He encouraged former committee members to stay connected. The BOAC is valued for its work and the opinions of its members.

John Palguta recapped the discussion of NSF FEVS results. The survey showed good results with an upward trend from 2013. Mr. Palguta stated that he joined the BOAC six years ago when NSF was trying to overcome a slide in the results. NSF has rebuilt in the past six years and is in the middle of planning for further increases in scores. John provided the following highlights:

- Government-wide engagement is 68%; NSF's is 77%
- 71.2% of NSF employees responded and out of 17 mid-size agencies, only four have higher responses, and 12 have lower responses
- In 2018, NSF was 8<sup>th</sup> in the Best Places to Work ranking, and is projected to move up when the 2019 rankings are released
- 2012 was a low point and NSF has improved steadily since then in the face of a major physical move, changes in administration, and the longest shutdown in government history
- Good results are not accidental and are the result of a lot of work from the management team
- On the FEVS element "Organization's leaders maintain integrity" – there was a 15% increase
  - Moving forward, NSF will have challenges and opportunities including leadership transition that includes the departure of Dr. Córdova. During this time, Dr. Crim's interim leadership will be key.
  - Employee engagement and action planning will be crucial
- Continue to elicit feedback from employees and continue to involve employees – how do we make things even better and how can management help us do that?
- Workload concerns by employees – do something different, do less, get the employees involved in making the mission work
- Continue to carefully select and train all managers, particularly first line supervisors
- People management and employee engagement is critical
- Suggested that a goal for the 70<sup>th</sup> anniversary year be that NSF break back into the top five Best Places to Work

Dr. Crim noted that Dr. Córdova has put together a very strong leadership team from among programmatic and other division and office leadership. NSF understands how to marshal resources to do well during leadership transition. Regarding workload, we need to determine what we can do well, and what can we take off our plates. It is essential that leaders allow employees to respond to the facts on the ground.

John Kamensky recapped the discussion on balancing mission, risk, and compliance, noting the work that the Bipartisan Policy Center did also asked "How do we balance the outcomes?" He discussed

guidance on reducing administrative burden to University Research Administrators, pointing out that since 1991, caps have been placed on administrative burden costs, but there are 110 new requirements. Uniform guidance gave more flexibilities, but universities are choosing not to use it. Unless the various OIG's come to agreement, risk-averse universities will continue to use their current standards. An alternative approach may be fixed amount grants tied to acquisition thresholds of \$250K, which may reduce administrative burden to PI's and NSF processing and tracking staff. It is not clear whether this is a solution because the more established universities have a robust structure, while others may not. NSF is lead among agencies as far as the conversation regarding value-based management.

Dr. Crim responded that NSF currently has a plethora of policies driven by planning and data analysis. In general, organizations who have received a lot of scrutiny are more risk adverse. NSF's "A student" mentality also creates a risk-averse environment. One thing about accepting risk is that you must be willing to address that risk. NSF is trying to learn to think about this. NSF has been feeling the same way about some of the FEVS elements, and the agency is putting in a lot of hard work on both management and employee sides. We make the agency better while monitoring waste, fraud and abuse by making sure auditors are willing to allow us to live in an Enterprise Risk Management environment. He noted that NSF has had 22 years of clean audits and that happens because of the dedicated work of BFA and the Foundation.

Kim Moreland noted that we are all looking to the JASON advisory group report (on research security) to see how we can harmonize the rules. It is troubling because it affects our relationships with international partners.

General discussion on the report followed, noting the extreme interest in the report and the very high caliber scientists involved. Peers and others in the community will focus on National Security issues. Some ideas floated from the Research community ranged from "shut everything down" to "what's your problem that our students are from overseas?" We wanted that group to take a look because they can provide a balanced report regarding academic work and national security. Putting a big compliance requirement on one bad actor is not the intent. We have addressed public comments of the PAPPG and the reporting requirements for this type of activity. We are pre-briefing other agencies invested in the outcome of the report.

Mr. Grimes pointed out that tomorrow the BOAC will discuss NSF's Leadership Development Program, followed by a look at the potential for block chain technology in shaping the future of CXO. Our penultimate agenda item tomorrow is the state of the BOAC – is the BOAC helpful, do we have the needed expertise represented at the table, and what does NSF need from the BOAC. Dr. Crim expressed his appreciation for the BOAC, noting that NSF values the BOAC's advice and really wants to have it. NSF can't always do exactly what is suggested, but NSF values what BOAC says. Finally, Alicia Knoedler will present an update on the Committee on Equal Opportunities in Science and Engineering (CEOSE). She noted that a PDF copy of the report is available and will be discussed tomorrow. Dr. Crim noted that NSF has great gender balance in comparison to other agencies. Focusing on inclusion is a real way to lower the barriers and increase diversity. Inclusion is a powerful thing.

The meeting adjourned for the day at 5:30 p.m.

On Tuesday, December 10, Co-chair Susan Wyatt Sedwick called the meeting to order at 8:00 a.m. and made announcements. Members were reminded to sign in to have their attendance counted.

### **NSF's Leadership Development Program**

Presenters: Doug Deis; Macey Cox; Tracy Bojko, OIRM

Discussants: Jan Jones, Chuck Grimes

Panel: Nature Ginn, OIRM; Amelia Greer, ENG; Bill Miller, CISE; and Charisse Carney-Nunes, BFA

The NSF Leadership Development Program (LDP) was designed to make internal NSF candidates competitive for internal positions, to address the need to develop leaders who could step in during transitions, and to give technical experts the skills needed to step in leadership and executive roles. The LDP curriculum consists of 17 formal courses over the course of one year, with additional time for networking and development of skills outside the current functional area or office. It is suggested, though not mandatory, that managers consider LDP graduates for selection to leadership roles. The LDP cohort began training in 2017 and is the first since 1991. The cohort graduates on Thursday, December 12, 2019.

Macey Cox briefed the selection phase of the LDP. Applicants self-certified their interest in applying. There were 100 applicants, and a total of 29 were selected (17 supervisors and 12 leaders). Factors affecting selection included OPM-required competencies, a timed assessment, a problem-solving skills course, time in Federal service, grade level, and current and future organizational needs. All applicants were afforded the opportunity to get feedback from and discuss the overall assessment process.

Tracey Bojko presented the LDP program evaluation logic, focused on evaluating goals and developing/assessing multi-year outcomes. Participants reported positive experiences in the LDP with direct applicability to their current jobs. Those in the Executive track believe the program prepared them to be great Executives. The LDP has reached its initial goals and will continue to be evaluated as time goes on.

Panel members were asked to recount their experience with LDP and recap their career, describe something unique about the LDP, and note what was a challenge with LDP.

Amelia Greer

- Amelia noted that her career path began as a high school teacher. She wanted to make a bigger impact and came to NSF, left, then came back to NSF for 4 years. She loves the mission and impact of NSF but did not see a clear path on how to advance at NSF. LDP opened up paths and gave her a clear vision.
- Time set aside for the program was a unique experience. It allowed her current supervisor to be more aware and able to adjust time for her. Being able to see the leadership side helped her to reflect and gain insight on what the advancement path looks like. Experience in the LDP gaining outside perspective was valuable in creating the language for a clear vision.
- A big challenge is that because NSF is a flat organization, there are fewer supervisors, so it is harder to find a supervisory position.

Charisse Carney-Nunes

- Charisse has had a winding 21-year career at NSF: Attorney OGC (administration and scientific issues, diversity), Authorizing committee for Congress - OLPA – AAAS, BFA direct support for government grants, uniform guidance and implementing NSF recovery and Data Act. LDP helped enhance the formal training she has had and gave her the opportunity to use her organizational skills to experience handling operational issues and reviewing management plans with hard timeframes as the Acting DDD to EHR/DGE. In that role, she married her operational and technical skills to lead her staff in developing a policy change to reimburse reviewers despite not having the panels – a huge change that had a major impact. She said the LDP allowed her to see a new view.
- The cohorts were great. They became a learning community, engaging with NSF leadership on Leadership issues.
- The biggest challenge was the lack of guidance in hiring detailees (each participant is expected to complete a detail outside their organization). Fortunately, her supervisor was a huge supporter, as she wasn't sure how well the program was seen and supported.

#### Bill Miller

- Bill has 20 years' experience as a spacecraft system engineer in USA and Europe, a PHD in neuroscience, served as AAAS Large Facilities, BIO/FO facilities and neuroscience, and has been at CISE for the last 5 years. Has taken a lot of the formal training from OPM and NSF and was very interested in the LDP program upon the announcement. The cohort system opened up a whole new way of working at NSF and exposed him to the different tracks of leadership. Participating in LDP leads to more exposure at the Executive level and details allowed him to see the difference between the administrative versus program aspects at NSF. He recognizes that completing LDP isn't a guarantee for promotion.
- Cohort aspect of LDP was great. Executive part of the cohort was a little bit smaller but was a comfortable space to discuss and ask questions. He felt he had license to step back and look at things in a new way.
- His biggest challenge was the number of transitions during the time and figuring out how to use the coach. It is important to have goals set-up.

#### Nature McGinn

- Nature has worked at AAAS in Program (a lot of interagency and technical experience). LDP is all about personal and professional development, and introspection. The primary lesson she learned was to stop listen, ask questions and, only when asked, provide solutions.
- The agency is very fortunate to have Macey and Tracey, and the coaching and training were well researched and varied. Cohorts were engaged and energetic which let us develop a great network. The program offered a ton of support for development, and coaching was awesome.
- The separation of the cohorts was a little artificial, given that the desires for learning and development are the same among both. It was very difficult to get the group together.

#### Feedback and Discussion:

Jan Jones began the discussion by suggesting that NSF needs to research the soft skills that need to be developed in the candidates selected for the LDP. It is difficult to train soft skills, but it is absolutely necessary to train them. For LDP candidates to have a successful experience, NSF needs a clear definition of requirements for success and a path to reach those requirements. What does high potential mean to NSF? NSF must select the coaches and mentors that embody the soft skills that NSF

has identified. “Coaching is unilateral - it is all about you.” It is said that those we want to follow are the ones that embody soft skills we want to follow.

Chuck Grimes presented several concerns about leadership development programs. He noted that return on investment in leadership development is tough to measure. Leadership development results tend to be descriptive and subjective, rather than numerical and objective, and furthermore, the return on investment for leadership development activities is almost always long-term.

Leadership development must account for the fact that the way people learn has changed over time. Learners now prefer hands-on, experiential activities that cater to their shortened attention spans. Leadership development programs must adapt to include experiential learning activities, such as business simulations or gaming, to drive engagement and meaningful skill development. Skills needed for leadership have also changed and more complex and adaptive thinking abilities are needed.

Often programs are content-focused and ignore the most important aspects of any leadership development program, as Jan noted: desired employee needs and organizational goal outcomes. Establishing these desired outcomes is not easy – there is real tension between hiring those developed in house and bringing in outside talent. Ultimately, the success of any training program depends on the alignment between training goals and mission objectives.

Finally, even if not stated, the perception is often that the program is a ticket to a promotion. The real question is whether senior leadership is committed to leveraging the talent they are developing – much harm can come from building, then dashing, expectations.

Pamela Webb noted the importance of realizing failure is the normal course of things. Nature had realized several challenges in her career. She worked with her coach on how to perceive things, and now has a new view. Amelia worked with her coach on challenges with her cohort. Bill moved from the program to operational side. Program people have opinions, and the operational side doesn't necessarily appreciate their comments. His coach helped him adjust his expectations.

Michael Holland suggested looking at formal progression, an important tool on how to build capacity within the Agency. Also, participants must understand that the skill set gained is going to help them even if there is not subsequent upward movement. The detailee component is important and there needs to be tracking to understand the relationships and how to connect the right people to the details that benefit the future of NSF and Science Policy. The return to the individuals in the Program is incredibly important but also need to look at the Program side and how they are positioning the Agency.

Ned Holland commended the Agency for doing LDP, noting that leadership doesn't run without priming it. He suggested that if NSF is looking for places where leadership development is done well, look to the military. Consider alternatives to details – for example, establish executive assistant positions for 12-18 month assignments working next to an executive. After 18 months, the executive assistants must find another job. It is good for the government to have people move around. Regarding coaches, we don't use them as aggressively as the private industry does. Pay attention to the application process, when you are recruiting people. One of the basic recruiting rules is to not recruit people who don't show interest by applying.

John Kamensky also commended NSF and noted that to be successful NSF must manage expectations, select people rather than relying on self-identification, and review applications to make sure candidates

are aligned with future organizational needs. Joe Mitchell noted that the CXO mission support program and the White House leadership development program focus on cross-agency issues and enterprise skills. Robert Dixon noted the importance of succession planning, and the challenge of moving from outside hiring to developing and hiring internal candidates. Susan Sedwick said that many leaders are reluctant leaders. Make sure to identify the reluctant individuals. Consider creating an alumni association.

Wonzie Gardner agreed that NSF needs to manage expectations. Need to plant the oak tree seeds and allow them to branch out. There is a lot of potential to the program.

### **CXO Office of Tomorrow: B is for Blockchain**

Presenters: Dorothy Aronson, OD; Mike Wetklow, BFA, Chezian Sivagnanam, DIS

Mike Wetklow noted that last year, we discussed the “ABCDs” of technology; automation, blockchain, cybersecurity, and data analytics. NSF is now really focusing in on the blockchain element. The goal of this session is to teach blockchain concepts and get guidance from the committee. He then followed up with a brief introduction. This time last year there was a BOAC session titled CFO of the future which explored the future of using robots and people along with shared services, projecting into 2026. There have been a lot of lessons learned since that time. We have executed our first robot pilots and other offices are implementing robotic processes. He referenced other BOAC meetings where there were presentations on human capital that encouraged NSF to think about the future in comparison to where we are right now. And the focus is no longer just the CFO – we have rebranded to focus on CXO offices. The name is “Tomorrow” to prevent us from getting too far into the future.

Dorothy Aronson began by explaining what a blockchain is and polling the audience to see how many people feel comfortable with blockchain; no one was comfortable saying yes. She referenced GAO’s publication on blockchain capabilities and noted that when blockchain is fully implemented it should act like a spiderweb, in the sense that when a fly hits the web, the whole web vibrates. Blockchain works like that, when one transaction hits the blockchain the whole thing is affected.

The terms block and chain are deceiving because they make it sound linear, and Dorothy went on to explain that it is a network of organizations that interact with one another. Two examples are money (bitcoin and the ledger) and grants. She posed the question, “What if proposals were what everyone wanted to know about, and not just dollars?” She went on to explain how blockchain can be used to identify similarities in proposals across different agencies, who might have similar proposals and common interests. She then turned the conversation over to Chezian Sivagnanam, Chief Enterprise Architect in the Division of Information Systems to explain how this is being envisioned at NSF.

Chezian noted that blockchain is used today in organizations where one person does not have all the information to solve an issue alone. The capability of blockchain is to utilize the cloud in order to pass knowledge. Agencies today have research that is overlapping. The GAO did a report identifying multiple agencies funding similar activities. NSF took some interest in this and wrote a whitepaper about three months ago on building a ledger distributed network through blockchain to identify researchers engaged in programs that may be related in nature. This led to a micro project between GSA, NIH, NSF, with a sample of 43,000 proposals which were each “fingerprinted” using Word2Vec, a data science language using vector-based methods. Dorothy Aronson noted that the basic nugget was to see if NSF has overlap with other agencies. Agencies cannot just show each other the proposals so we compare the fingerprints to evaluate the similarities of proposals. Program officers can then contact one another and

discuss the overlaps. Blockchain also has the capacity to store false positives, increasing the accuracy of comparisons.

General discussion followed. Dorothy noted that the fingerprint is machine generated. In response to a question about false positives, she noted that the concept works great in certain areas, like biology, but chemistry has been throwing false positives. Since this is a pilot, they are still trying to define benchmarks to hone matches and compare scores. Narrowing down the algorithm to make the fingerprint smarter and how to limit proposal data with the fingerprints are challenges. Dorothy Aronson added that in her mind it is best to have more false positives right now. This will be helpful to us to better understand this is a matter of a softer, not hard, science. It is not designed to replace humans evaluating proposals, but more to prevent duplication of funding.

Kim Moreland noted that she came in with a primitive notion that blockchain is an innovative way to store data but sees it as mysterious and alarming. Because we are using a spiderweb metaphor that gives it an even sinister quality. When coupling the idea of the spiderweb with the idea that proposals will be evaluated electronically with the intent to eliminate duplication, there may be a sinister quality to the research as well. There is no certainty that all agencies will fund this. This appears to point a finger of wrongdoing at the proposal stage not at the award stage when you would be more concerned about duplicate funding. She is concerned there should be a different way to tell the story so it's a little less threatening. Dorothy Aronson replied that whether we chose to adopt these technologies or not, they are out there. She would like to think that we can introduce people to these concepts at an earlier enough stage, and if this presents a legal challenge, we will stop. The idea is to find out if we can share this information more easily (by liberating federal data). There is a lot of discussion with HR records, and how do we share ideas about people? Her job is to carefully introduce people to what is coming. She agrees that the analogy needs work and it is important to figure out how do we encourage the work force to be ever ready and not be frightened because a lot of change is coming. The goal is the advancement of science; what we find in so many cases is that students pursue advanced degrees and many of the questions are not well-posed and people end up performing duplicate work due to questions not being well-posed.

Mike Wetklow introduced Craig Fisher by phone, a subject matter expert who works with the Treasury Department. He mentioned that about three years ago at University of San Diego there was a grant accountant who said, "Can we do something about multiple payment systems (letter of credit)?" He noted they have grant accountants who specialize in the different payment systems for different agencies in one university. When he came back to NSF he wanted to find out how ACM\$ works and how NSF came upon it. He learned that NSF leveraged a copy of it from Education. Mike Wetklow explained how it is a distributed ledger that is connected by blocks of data that are protected through math science.

Craig Fisher stated that blockchain and distributive ledger technology started in 2017. Treasury used this technology to do a proof of concept using and managing cell phones and tracking software licenses to see what blockchain had to offer. Blockchain really enables efficiency with P2P connectivity, and there is a great deal of transactional transparency. The success of this application prompted application of blockchain to reduce the reporting burden on grant recipients and sub-recipients by using one letter of credit system instead of five and using tokens instead of letters of credit to represent money. Today, a grant is awarded, and payment is initiated. Sometimes the work is done before payment is processed. There is also a lack of transparency over reporting and payments. Moving forward we are hoping that grant recipients will timely receive tokens that represent money; a token will be able to be redeemed

for money, or that token can transfer downstream to a sub recipient. This will provide transparency so that we can see every time money is transferred - we can see where it came from and where it is going.

Committee Action/Feedback:

NSF is looking for the following feedback:

1. How do we educate the community and demystify distributed ledger technologies (e.g., do we need a myth busting campaign)?
2. How to scale the use cases, design a governance process and operationalize the tool as an innovative government-wide shared service solution.
3. How do we motivate and get the Research Community excited about this?

BOAC members discussed possible benefits of blockchain, and experience with blockchain at FDP. FDP is interacting with Treasury, universities, and this is a dry run for blockchain. PIs need to be on board or there will not be grants to manage. PIs may be doubtful that proposals would be evaluated fairly. Chezian responded that right now this is just between agencies at a high level. Before we take this to PIs we need to develop new terminology. There needs to be a governance process that is actually built on top of this external community. We are only at a small beginning with this. But there is no way a PI would be disadvantaged by identifying program.

Members wondered if blockchain facilitates problem solving where individual agencies have more information individually than the federal government at a high level, and whether blockchain could reduce reviewer burden. Instead of sending something out for multiple reviews, perhaps coordination through blockchain would allow one review instead of multiple ones. Disciplines that have multiple places to apply within the federal government are healthier than those that have just one. It would be useful in this case to make sure to be super clear as to what efficacy is being sought and what value is being provided. John Kamensky noted that agencies are afraid to embrace technology because of a fear that they will be audited and lose money. To address this, consider bringing the IG to show them how it works. The implementation of the DATA act, using agile, was viewed as successful by the IG community because they socialized the ideas with the IG.

## **State of the BOAC**

Presenters: Charisse Carney-Nunes, BFA; Jeff Rich, OIRM

Discussants: Chuck Grimes, Susie Sedwick

NSF is constantly evolving and so must the mission operations and support provided by the Offices of Budget, Finance and Award Management (BFA) and Information and Resource Management (OIRM). Charisse and Jeff reviewed changes that have occurred in the past six years in NSF, BFA and OIRM, in areas such as budget, staffing, strategic and priority goals, and Federal Employee Viewpoint Survey (FEVS) scores. The BOAC provides valuable advice for NSF/BFA/OIRM to help business operations and to meet its strategic goals. Advice received from the BOAC over the last six years was reviewed with examples of success stories.

Charisse Carney-Nunes began by comparing the world today and what was happening in 2014. NSF funded researchers produced new maps of the material located between the stars in the Milky Way and found the smallest known galaxy harboring a supermassive black hole. NSF was gearing up to support the May 2015, dedication of new, advanced detectors at LIGO – and we all know how THAT ended –

only 4 months later with the ground-breaking discovery that spawned a whole new field of astronomy. On planet earth, NSF-funded paleontologists identified two new dinosaur species discovered in Tanzania.

Jeff Rich then moved forward to compare the 2014 budget to the 2019 budget. The budget had increased 12.5% from \$7.2 Billion to \$8.1 Billion. While the difference in Agency Operations & Award Management (AOAM) budget only had an increase of 8.8%, keeping overhead low at 4-6% of the overall NSF budget.

Charisse discussed the BFA staff and how there has been a lot of change. BFA staff highlights - There are 5 new executives at BFA since 2014. Jeff then mentioned that it is similar for OIRM, except a little less than half were non-NSF employees in 2014. He then mentioned that OIRM did not have a deputy in 2014, and now does. He pointed out that Peggy Gartner and Dan Hofherr went from being Deputy to head of the division.

Jeff went on to explain the differences in the NSF strategic goals from 2014 to 2019. "Excel as a Federal science agency" has evolved into "Enhance NSF performance of the mission." NSF had 3 priority goals in 2014, and only one in 2019.

Charisse noted that there is an index of all the BOAC recommendations over the years. Recommendations come in different forms – findings through subcommittees, receiving advice, and general consensus of the committee captured in notes, all documented by your co-chairs. She thanked BFA's new Management Analyst, Anna, for analyzing, slicing and dicing these recommendations, as well as to the whole team, Joan, Patty and Maria, for working so hard to document them.

Jeff discussed the four pillars of Renewing NSF – IT works for all, adapting the workforce, a standardizing process, and expanding public and private partnerships. Relocation and change management was instrumental to make the move from Arlington to Alexandria for the staff as smooth as possible. He noted the importance of BOAC/NSF interaction with respect to the FEVS scores.

Charisse went on to discuss the hard part, what advice was not implemented? She had to go back to 2014 to get a good example. At that time, NSF had a lot of acting executives. This concerned the BOAC members, and NSF replied that this is how government works sometimes. And now we have very few staff that are acting.

Jeff asked the members to discuss the BOAC impact, and to look forward on how to leverage the BOAC.

#### Committee Action/Feedback:

We will pose the following questions first to the departing Committee members and then to the members at-large:

1. Please answer one of two optional questions:
  - a. Look back: how far we've come and BOAC impact on NSF
  - b. Look forward: opportunities to leverage BOAC to benefit NSF/BFA/OIRM over the next 3-5 years
2. In your time on the BOAC, discuss gaps you have observed and how we may address them going forward (i.e. committee size, scope, skill sets, diversity of topics presented, etc.)

Jan Jones noted that NSF is an A+ agency and wondered about the value of a BOAC in an agency that is as high performing as NSF, particularly regarding scope, depth and structure. This is a large board and is diverse with talent. The mission of NSF is so unique from the perspective of grants. She has been on advisory boards where subcommittees have been established; where more agency challenges can be looked at, and where board member's expertise could be tapped into a little better. She suggested establishing sub-committees to tap into folks with academia or federal backgrounds.

John Palguta pointed out we no longer have big binders with all these hard copies. He reiterated Jan's comments; we did not always have action items and what did you want us to think about. Now for every discussion NSF identifies what it is it wants feedback on. He brought up the possibility that there might be seminars just for BOAC's information. Having an orientation session for new BOAC members could also help with certain NSF characteristics. For example, no other agency has rotators, and we always need information on acronyms. He has always been impressed on background diversity. There are 15-20 members on the BOAC and that's a good range. In conclusion he said he appreciated the opportunity to be a part of the BOAC. It was then noted in the past some members had an orientation; he did not.

Mike Holland felt risk management was the area the Foundation was the most receptive to input. This is a backbone of the advisory committee. Look at the history and evolution of the federal R&D portfolio. Once Federal R&D was the largest in the US, now the private sector eclipsed the federal sector. We are coming up on a period where the US - Private and Public research will not be the largest on the planet. NSF must start paying attention to business intelligence tools that NSF can start building and piloting. In the past other countries would mimic the US, but this might not be presumed in the future. Building business intelligence is something NSF really needs to look at moving forward. The BOAC could stand to use a sub-committee to verify implementation of things surfaced by following up in a regular way.

Doug Webster said BOAC relies on NSF to bring the most important issues to the table. The issues brought to BOAC in the past have been beneficial. ERM has been a passion of his and feels NSF has been in the forefront of this. This is more than just a compliance issue for NSF; in balancing risk and oversight he would like to leave the committee with the urgency to take this to the next step. Focusing on risk is not the only objective of ERM, but also to try maximizing the value that is brought to a myriad of stake holders. Value Based Management tries to take a portfolio view to balance risk. Think about not continuing on ERM but lead the Federal Government in Value-Based Management (VBM).

Susan Sedwick noted that science and security need to go hand in hand. She thought coming onto the committee would be mainly about grants management, but that has been less than 10% of what the committee does. Change will be the focus of many future discussions, and in order to prepare for change management discussions NSF should consider:

1. Harmonization to keep it manageable (such as what directorates need to focus on blockchain more than others). Keep in mind that a lot of universities will keep their feet firmly planted in one type of research. Many agencies in export control can help the change of upcoming research in the US. Since US will no longer be the sole leader for scientific research, maybe we need to focus on this.
2. The process of entering this building is absurd and invasive. Once we are naked and afraid, we are prodded to get our stuff and get out of the way. It is concerning how invited guests are treated in security.

NSF is a premier federal agency to work with and Susan is appreciative of being able to serve on the committee as a co-chair.

Alicia Knoedler noted there is a lot of opportunity for collaboration within this committee. As we move forward, we need to look for a thread all the time in order to give recommendations to more than just the group that comes to the meetings. BOAC has a great attendance but may need to point out to more people over time.

### **CEOSE Update**

Alicia Knoedler noted that CEOSE meets 6 times a year, and recommended spending appropriate time to prepare for the meetings. A Congressionally-mandated CEOSE report is put together every 2 years and transmitted throughout the broader research community. She noted commendable NSF efforts in implicit bias trainings for reviews and addressing sexual harassment issues. The 2017-2018 CEOSE report focuses on diverse communities. It notes that some disciplines lend themselves to being diverse, e.g. the social sciences. She encouraged NSF to continue to provide leadership in increasing the participation of underrepresented groups. She concluded that future reports would try to show how one's race, gender identity, religion, and background can affect perspective and identity in the report.

The meeting was adjourned at noon.