# Museums Empowered

Sample Application MA-40-18-0509-18
"Building Staff Capacity in Data Analytics"

## Denver Museum of Nature and Science

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| Amount awarded by IMLS: | $142,836 |
| Amount of cost share: | $142,363 |

Attached are the following components excerpted from the original application.

- Abstract
- Narrative
- Schedule of Completion

Please note that the instructions for preparing applications for the FY2019 Museums for America grant program differ from those that guided the preparation of FY2018 applications. Be sure to use the instructions in the FY2019 Notice of Funding Opportunity for the grant program and project category to which you are applying.

## ABSTRACT

**Overview:** The Denver Museum of Nature & Science (DMNS) is embarking on a long-term effort to leverage insights from its existing data sets and identify new data sources to support its mission, increase relevance, and better serve its community. The priority question we seek to answer through data analytics is: what do our guests – both members and non-members – do when they visit, and how do they interact with us? The underlying question this data provides insight into is what are the preferences and interests that define our different audience segments, and how might we mine this information to maintain or increase our relevance to them? To this end, DMNS requests a Museums Empowered Digital Technology grant to build the capacity of a Data Team; identify technologies including business analytics and machine learning that can uncover trends and enhance the quality, quantity, and types of guest behavior data DMNS is able to capture; and use data to make better informed business decisions and develop personalized approaches for engaging the community. In addition to smarter business operations, data analytics can reveal ways to create customized experiences that surprise and delight our guests and connect them in more personally meaningful ways to the Museum's mission to be a catalyst that ignites our community's passion for nature and science.

**Need:** DMNS currently captures data about guests in a few ways: guest and member surveys collect data on demographics, overall impressions, and satisfaction. The Membership Customer Relationship Management (CRM) tool and point-of-sale systems capture a more complete picture of members from their giving history and interactions with the Museum to their utilization of member benefits. However, more optimized use of data analytics can tell us much more, particularly around non-member guests and their behaviors. Additionally, the DMNS data environment is complex with many systems serving various functions and there are opportunities for these systems to intersect. Several peer cultural institutions have implemented business intelligence and data visualization tools that have increased revenue and enriched experiences that improve guest satisfaction and connect guests more deeply with their missions. DMNS has a crucial opportunity to more fully use data, particularly as this effort occurs concurrently with the launch of a new strategic plan that will transform how our guests connect with nature and science through the Museum. As a cross-departmental group comprised of emerging professionals who have expertise and work with data, systems, and databases, the Data Team is ideally suited to recommend an overall data strategy and explore solutions. The proposed professional development will optimize the effectiveness of this team.

**Activities:** Over the course of this two-year project we will: build capacity of the Data Team, through training, collaborating, and scanning the marketplace for innovative ideas; establish an overall data strategy with guidance from a consulting data scientist; conduct pilots of new guest data capture tactics; and address opportunities to improve various Museum functions revealed by data analytics. All of these efforts will focus on technologies that enable more and different types of guest data collection.

**Benefits:** The project has multiple benefits: 1) The seven staff members on the Data Team will benefit from skill and knowledge development. 2) DMNS as an institution will benefit from a more data-savvy staff, more efficient marketing spends, more relevant or accessible programming that responds to guest trends, increased revenue, and greater guest satisfaction. 3) Museum guests will benefit from more enjoyable, personalized, and memorable experiences enabled by anticipating their needs and creating digital participation. 4) The Museum field as a whole will benefit from the development of new leaders equipped to respond to fast evolving technology advances and keep museums on the forefront of innovations that entertain and educate the public.

**Outcomes and Measuring Success:** Museum staff participating in professional development will increase their understanding, interest, and confidence that they can apply their learnings to their work as a result of the training. We will also see a decrease in the number of data issues, a strong indicator of improved data integrity, which will result in a decrease in expensive data cleanup and increase in staff efficiency, and can also lead to higher guest satisfaction. Ultimately the proposed professional development, creation of a data strategy, data capture, and data analytics activities will take DMNS to a higher level of creating customized experiences for guests, enhance targeted marketing opportunities and other better informed business decisions, and evolve the entire Museum staff to more fully use technology and appreciate the value of data.

## 1. PROJECT JUSTIFICATION

**A. Project Description.** The Denver Museum of Nature & Science is embarking on an effort to leverage insights from its existing data sets and identify new data sources to support its mission, increase relevance, and better serve its community. DMNS requests a Museums Empowered Digital Technology grant to: 1) build the capacity of a cross-departmental Data Team; 2) develop a data strategy; 3) identify new digital technologies including business analytics and machine learning that enhance the quality, quantity, and types of data DMNS is able to capture about guest behavior; and 4) use data to make better informed business decisions and develop personalized approaches for engaging the community. This project will help the Museum fill critical gaps in what data we collect and how it is utilized to improve operations, enhance the guest experience, and inform the field. The priority question this data provides insight into is what do our guests – both members and non-members – do when they visit, and how do they interact with us? The underlying question this data provides insight into is what are the preferences and interests that define our different audience segments? In addition to smarter business operations, data analytics can reveal ways to create customized experiences that surprise and delight our guests and connect them in more personally meaningful ways to the Museum's mission to be a catalyst that ignites our community's passion for nature and science.

**B. Need, problem, or challenge addressed.** DMNS is fairly strong compared to peer institutions in its adoption of digital technologies and audience research, and this foundation enables us to take the necessary leap into data analytics in line with emerging trends in the industry. The DMNS data environment is complex with many systems serving various Museum functions. Galaxy is the point-of-sale (POS) system. In 2016, food services, retail, and ticketing were consolidated into Galaxy from three different systems. The Museum uses BlackBaud Raiser's Edge (BBRE) as the donor and member Customer Relationship Management (CRM) system (500,000 records, 62,000 active member households), Digital Cheetah for volunteers (1,800 active volunteers), Prophix for finance, and EMu for collections, which is complemented by IMu and LUNA Imaging for public digital access to collections. We have made recent custom software development investments: a custom application called eCard for members (dmns.org/ecard), an upgraded webstore for online purchases and donations, and an online reservation system for booking reservations for school groups (300,000 school group guests served annually). We use Umbel to build segments and analyze our audience for membership and marketing purposes. Reporting capabilities with SSRS enable data sharing across departments. In 2018 the Museum is exploring the feasibility of an enterprise-wide CRM that would tie these databases together and further enhance data completeness and cross-departmental access.

DMNS' Audience Research and Evaluation (ARE) department also collects aggregated guest data including demographics, overall impressions, and satisfaction. Guest surveys are conducted by research associates on the Museum floor and analyzed in a report every other year (n=5,000). See the 2016 guest experience report in Appendix A. In the off-years, a member survey is administered via email (n=6,000) (2017 report is found in Appendix B). The ARE department also conducts research in the community with non-visitors to understand their needs, interests, and motivations as they relate to the Museum. While this research provides valuable insights into both our audiences and non-visitors that currently helps to inform decision-making, gaps in our understanding certainly exist that data analytics can help us to fill.

With the POS integration described above, we can now see all member transactions including ticket, food services, and gift shop purchases, giving us a more detailed picture of our individual members' interests and preferences. However, our guest profile data is limited to members, that is, those whose data resides in BBRE, and limited to these types of transactions. Big data-wise, we know little about non-member guests, who comprise 55 percent of all guests; the only data point captured when paying non-member guests purchase tickets is the guests' ZIP code or country of residence. Other transactions for paying non-member guests are disassociated so it is not possible to gain a full picture via data of who that guest is or what they are taking part in when at the Museum. There is significant opportunity to increase our data collection points and collect all user data in a centralized data repository in addition to BBRE and our transactional databases. Adding data collection points will help DMNS to mine non-member data and create new audience segments for targeted

messaging and marketing. Collecting preference and interest data will guide the creation of future products and programs that are relevant to our guests.

Through research and professional contacts, we are aware that several peer institutions are applying data analytics to understand guest behaviors. **Point Defiance Zoo and Aquarium** is using IBM big data software to gain insights into the massive amounts of data they are collecting. These insights make possible instant promotions that have already resulted in increased sales. They are also capitalizing on guests' use of social media by tying promotions to social media activity. They are now exploring near-field communication with mobile devices as another way to interact throughout the zoo. This technology-enabled participation allows guests to feel like participants in the mission of animal conservation, which stretches the emotional stickiness of their experience and ultimately advances the mission.[1] **Cincinnati Zoo** capitalized on having one point-of-sale system that is integrated into attendance, enabling "at a glance" analysis of a full picture of guest patterns and behaviors. They are using data analytics to customize member benefits and inform incentives and loyalty programs; this has resulted in both a smarter operation and more enjoyable experience for guests.[2] A case study from the **Art Institute of Chicago** has also informed DMNS' vision for optimized data use.[3] Once they invested in staff capacity to identify, maintain, and process data sets, they were able to effectively analyze, communicate, and leverage data about their guests. In the first year of applying staff and technology resources to data analytics, they made decisions about marketing spending and content that resulted in a significant gain in revenue. These institutions have found that smart data use translated immediately into greater guest relevance.

With these organizations and others as inspiration, DMNS recently chartered the Data Team (see Section 2.C.). The Data Team is a cross-departmental group comprised of emerging professionals who are data "power users" – those who have expertise and work with data, systems, and databases in various capacities. The Data Team members understand Museum-wide data needs, how our data is structured, and the complexities of our environment. This cross-divisional team's goals are to: 1) Improve Museum-wide data integrity; 2) Identify areas of opportunity and make requests for new tools/technologies or other data-focused initiatives designed to help the Museum to achieve its business goals; and 3) Support other Museum staff – whether in Marketing, Guest Services, Museum Programs, Research and Collections, Membership, or Facilities – to use data to inform decisions. The team has the foundational knowledge in the domains of traditional databases, tools that interface with or rely upon the data housed in various databases, and various other data repositories (such as Google analytics) that position it well to build a data strategy and tactics to get us there.

To optimize the success of this project, the Museum needs to address knowledge gaps among the Data Team in data warehousing, data analytics, and data visualization tools. This project invests in the team's growth so they can understand how to implement technical solutions that will provide business intelligence for our internal stakeholders and communicate data insights effectively.

**C. Benefits.** The project has multiple layers of benefits:

- The seven members of the Data Team are emerging museum professionals; they will benefit from skill and knowledge development that will help to advance their careers.
- As the Data Team is charged with both identifying solutions and empowering fellow colleagues to utilize data to make decisions, DMNS as an institution will benefit from a more data-savvy staff, more efficient marketing spends, more relevant or accessible programming that responds to guest trends, increased revenue, and greater guest satisfaction.
- Museum guests will benefit from more enjoyable, personalized, and memorable experiences enabled by us anticipating their needs and creating digital participation.
- The Museum field as a whole will benefit from the development of new leaders equipped to respond to fast evolving technology advances and keep museums on the forefront of innovations that entertain and educate the public.

[1] https://www-03.ibm.com/press/us/en/pressrelease/41253.wss
[2] https://www-03.ibm.com/press/us/en/pressrelease/33351.wss
[3] http://labs.aam-us.org/blog/the-power-of-applied-data-for-museums/

**D. How the project advances the institution's strategic plan**. The creation and execution of a data strategy is concurrent with and integral to the Museum's $75 million strategic plan over the next five years to connect more and diverse people with nature and science in ways that are meaningful to them. This plan includes revamping 40,000 square feet of public space on the first floor, activating new experiences in the historic diorama halls, taking museum experiences out into the community both physically and virtually, and for the first time in its 118-year history, expanding programming directly outside the building into City Park. These bold projects represent significant new territory for DMNS, and it is imperative that data be used to inform the decisions that will impact us for many years. As specific projects are addressed, the integration of innovative technology and guest participation via digital technology is also critical to remaining relevant to our audiences.

**E. How the project addresses the goals of IMLS Museums Empowered.** This project will strengthen the Museum's ability to serve its public through professional development activities that cross-cut various departments. The project will build the capacity of a core group of staff members responsible for Museum-wide data systems. The team is comprised of emerging museum professionals, thus the investment in their growth is an investment in the next generation of museum leaders. The Data Team will become stronger advocates for museum-wide data needs and will be able to recommend smarter solutions. By providing support to colleagues in all departments, the Data Team will also help to build comfort with using, and appreciation of, data among all staff, which will generate systemic change throughout the Museum. Furthermore, the project will have demonstrable results both during the project period and beyond through the reduction of data issues, and anticipated increases in sales, membership sales and retention, and guest satisfaction.

**F. How the project aligns with Digital Technology project category.** The primary purpose of this project is to explore, understand, adopt, and optimize databases and data tools in support of Museum and department business goals and needs. The use of increased quantities and types of personalized data about our guests can transform audience engagement, marketing, and general operations. This investment enables DMNS to remain at the forefront of changing museum practices and fast evolving digital technologies.

## 2. PROJECT WORK PLAN

**A. Specific activities to be carried out and sequence of activities.** The Data Team was chartered in February 2018. Activity has already commenced will continue throughout the project period and beyond. An overarching focus of the Data Team is data integrity. The team will communicate about priority data issues and solutions through regular Data Team meetings. It will perform regular audits of the organization's data environments aimed at identifying problems and designing solutions and recommendations including but not limited to revising reports and adjusting existing configurations. It will work with the consultant data scientist in the initial phase of the project to define the Museum's overall data strategy and tactics, and will continue to consult with experts in the field to validate our approach. As the team identifies needs among DMNS staff, it will procure or produce trainings for staff on using data.

The pre-grant work and two-year project will consist of the following sequence of activities:

1. Pre-Award Training and Project Development (no IMLS funds requested) (Q2 and Q3 2018). Foundational work will take place between now and the start of the grant period. The Data Team will clean up the existing report server, run audit reports, and address necessary process changes. These steps ensure that existing data is reliable and more complete and help to identify the additional data points we want to collect. The Data Team will also receive foundational training on relevant business analytics tools such as Power BI and data warehouse building concepts. We will also conduct small scale feasibility testing around potential passive and active guest engagement data collection. In feasibility we are asking both what can different technologies do and if the solution is a fit with the guest experience. We will begin to build some assumptions about our data strategy.

2. Project Initiation (Q4 2018). With assistance from the DMNS Grants Manager and the Data Team, the Project Director will initiate the grant project, which includes setting up project management and time tracking systems, establishing team roles and responsibilities, and initiating a contract with a consultant data scientist. The Evaluator will assist in establishing baseline data for tracking metrics and designing the evaluation survey

based on our identified performance metrics. Data from TRACKER, the Museum's data defect tracking tool, will also be analyzed to capture a baseline on the number and type of data issues reported across the Museum.

3. Establish data strategy for the institution (Q4 2018 and Q1 2019). A data scientist will be contracted for an approximately six-week engagement. He will gain an understanding of DMNS' data needs and opportunities and work closely with the Data Team to guide the development of an overall data strategy, goals, and tactics.

4. Capacity Building for the Data Team (Q4 2018 – Q4 2019). The professional development plan for the Data Team is a comprehensive strategy that includes regular opportunities for collaboration; formal training on business analytics tools and data warehouse concepts; insights gleaned from working closely with a consulting data scientist; and exposure to current technology tools and trends through participating in conferences, trade shows, and research.

First, all Data Team members will complete 40 hours of relevant course work in the first six months of the grant period through Pluralsight (https://www.pluralsight.com/), an online learning provider. In addition to a few courses focused specifically on data analytics that all team members will complete, Pluralsight offers a wide range of course options that will enable team members to gain knowledge in areas most relevant to their positions. Additionally, the four Data Team members with the most interaction with data analytics (Barton, Engleking, Greufe, King-Miller) will participate in a 10-week online course in data analytics offered through General Assembly, a Denver-based provider of career-based experiential learning courses (https://generalassemb.ly/education/learn-data-analysis-online). This training provides a deeper dive on the subject beyond what can be gained via Pluralsight.

We have identified six potential conferences, trade shows, and other opportunities for the Data Team that will take place throughout Year 1. While the events below are the most likely candidates, some changes may be made depending on the final agendas. Funds have been budgeted to send two Data Team members to each event. Data Team members taking part in these events will later share out learnings with the rest of the team, so that all may benefit from these investments.

- Museum Computer Network (MCN) is an organization for professionals who seek to use digital technologies to help fulfill the missions of cultural organizations. The annual Museum Digital Transformation Conference will be held in Denver, Colorado in November 2018. Given the highly relevant focus and the fact that it will occur locally, at least two team members will participate.
- International Association of Amusement Parks and Attractions (IAAPA) is an organization focused on safe operations, global development, professional growth, and commercial success of the amusement parks and attractions industry. It serves amusement park, family entertainment center, water park, museum, zoo, and aquarium professionals. The annual attractions expo will be held in Orlando, Florida in November 2018 and the theme is "Fun Forward, Build the Future."
- The Internet of Things Evolution Expo (IoT) is geared toward business leaders spanning all sectors. The business intelligence and analytics track will focus on how machine learning and the manipulation of massive amounts of data are being used to gain new insights. Topics covered will include predictive analytics, process driven decision making, and distribute networks. The event will be held in Orlando, Florida in January 2019.
- The South by Southwest (SXSW) conference offers tracks related to interactives, intelligent technologies, and big data that could be inspirational and relevant to pilots as part of this project. The event will be held in Austin, Texas in March 2019.
- The Microsoft Data Insights Summit is a user conference for business analysts designed to help them identify deeper insights, make better sense of their data, and take action to transform their business. Attendees can meet directly with the Microsoft Power BI, SQL Server BI, Excel, PowerApps, and Flow teams to troubleshoot data questions. The event will likely be held in Seattle, Washington in June 2019.
- Disney Data and Analytics Conference is a forum to learn from leaders in the field of data analytics and learn about the latest trends and techniques in analytical tool development, scientific approaches, and extracting value from data. The event will be held in Orlando, Florida in August 2019.

5. Pilot new guest data capture technologies (beginning in Q2 2019): The Data Team will develop and pilot promising guest data capture technologies. Both passive and active tools that collect data beyond traditional transactions will be explored, and the Museum's Creative Tech Team will assist with implementation. Passive engagement technology can be used to collect anonymous guest engagement data without direct interaction. We have identified Radio Frequency Identification (RFID) as one key solution and the first to be implemented. While there are a range of technologies available, RFID has the lowest barrier of entry for current operations; it uses the existing process of ticket purchases and has a low-profile presence in the exhibits. Admission tickets will have an RFID code embedded in them. As people move through the Museum, the RFID readers will record the code on the ticket in a way that is unobtrusive and unnoticeable to the guest, and the Museum will gain large amounts of data on where guests go and their dwell time. This technology has been successfully implemented in amusement parks to collect data for similar purposes. Funds are budgeted to purchase the hardware and software (Microsoft Azure) needed to develop, install in 16 zones of interest in the Museum's diorama halls, and collect and analyze data from an RFID system (See Appendix C for a map of the zones of interest).

Active engagement data collection systems require a guest to choose to interact with a technology in some fashion, such as scanning a barcode or interacting via an app on a smartphone. In addition to telling the Museum something about that guest, active engagement opportunities can also be linked to immediate benefits for the guest, such as point accumulation toward a reward (shop or store discount, free passes, membership discount). The technology could take the form of a mobile app that enhances the guest experience, such as an educational app or rich media app that virtualizes the museum or the collections. The Data Team's participation in conferences and trade shows will inform additional tactics to pilot, and could include a non-member mobile application; beacon technology; and a recommendation service that uses aggregated data from transactions, upsell ticket scans, and other passive and active engagement opportunities.

6. Leverage data insights for specific projects (beginning Q3 2019): The Data Team's work will ultimately serve the larger DMNS community, including staff, guests, and the institution. They will partner with Museum staff on specific data projects and/or lend data expertise to projects throughout the Museum. They will enable Museum departments – such as Exhibits, Guest Services, Marketing, Membership, and Finance – to use insights from their data to advance department-specific goals. Additionally, they will execute on data insights in ways that enhance the guest experience and provide personalization, added value, and recommendations.

7. Evaluate and report (Q4 2019 and Q4 2020): The Evaluator will administer the evaluation survey and analyze and summarize results. The Manager of Application Systems will analyze data from TRACKER, the Museum's data defect tracking tool, to assess progress in reducing the number and complexity of data issues reported by staff. Both will share information with the PD to utilize as part of the progress reports for IMLS. See evaluation plan in section 3 below for more detail.

8. Disseminate results (Q3 2020 and beyond): Please see dissemination plan in section 2.F. below.

**B. Risks.** A challenge the Museum is working to overcome is gaining institution-wide buy-in around increased data collection about our guests. While there are many data advocates already, more widespread buy-in is critical. We have addressed this need in part by identifying an RFID system that poses the least barriers for implementation as a strong first pilot. Data from this system will demonstrate the benefit of passive data collection that will help bring any staff members who are leery of big data on board. Another risk to this project is the potential for staff turnover among the Data Team, with whom we are investing professional development resources. Should Data Team members need to be replaced, the Museum has a number of capable, up-and-coming staff members within the impacted departments who we are growing and who can step up.

**C. Project team.** The project team is comprised of the Project Director, the cross-departmental Data Team, the Creative Technology team that will help bring data capture ideas into reality, and evaluation staff. Roles are described below and time commitments are reflected in the cost share section of the budget.

**Eric Boen | Director of Technology. Project Director.** Boen oversees all technology-related processes and experiences throughout the Museum including creative technology which encompasses the website, web store, and interactives; enterprise-wide applications; IT help desk; and IMAX and Planetarium Operations. His

leadership will ensure successful project management as well as ongoing advocacy for the importance of data-informed practices that is critical to Museum-wide adoption.

**Data Team:**

**Valeria Barton | Business Analyst (Department: Finance).** Barton completed a Master's in Public Administration in 2014 then joined DMNS as a business analyst responsible for financial and attendance data analysis.

**Molly Engleking | Data Analytics Supervisor (Department: Membership and Development).** Engleking received an M.S. in Project Management in 2014 and began working at DMNS in 2016. She uses various data analysis tools, including Umbel, Google Analytics, and Mail Chimp to segment and understand guest behaviors. She reviews data on member usage patterns to predict future patterns of behavior that inform decision making for the membership department.

**Kyle Greufe | SQL Report Writer (Department: Enterprise Applications).** Greufe has worked with databases and reporting systems since 2012 and has worked at DMNS since 2016. He develops new and improves existing reports generated from all of the Museum's databases and has an understanding of end user needs and the data environment that will be valuable to the Data Team.

**Charlie King-Miller | Manager of Application Systems (Department: Enterprise Applications).** King-Miller has worked with databases and systems at DMNS since 2011. She currently provides strategic direction for software and data configuration and all SQL data functions. Prior to her current position she was the fundraising database manager so she also is expert in Blackbaud Raiser's Edge.

**Aurora Lee | Digital Marketing Specialist (Department: Marketing).** Lee started working at DMNS in March 2017 as the chief website manager and editor and lead on digital advertising, email communications, social media strategy, execution, and analytics.

**Leana Rupprecht | Application Systems Specialist (Department: Finance).** Rupprecht provides system application support for Galaxy, the Museum's event management system, and Great Plains (accounting software). She became the administrator of Prophix budgeting and forecasting software when the Museum adopted it in 2016. She is familiar with most of the Museum's databases and reporting capabilities.

**Cori Van Horn | Guest Services Manager (Department: Guest Services).** Van Horn has specialized in customer service at DMNS since 2003, and since 2013 has managed the Guest Services department. She is responsible for entering attendance data and quality control on data entry and sales for this department.

**Ian Holtum | Creative Technology Manager.** Holtum is highly experienced in trending technologies and approaches to interactive development. He and members of the creative technology team will develop and implement new technologies – both active and passive – that capture guest data.

**Andréa Giron-Mathern | Director of Audience Research & Evaluation.** Giron-Mathern has led the evaluation strategy for many previous IMLS grants awarded to DMNS. She will provide overall direction and supervision of the project's evaluation. Specific tasks may be assigned to an evaluation team member.

In addition, **Mur Taşan, PhD**, will serve as a consultant data scientist. Dr. Taşan has built intelligent marketing solutions for Craftsy, a Denver-based technology start-up, and worked with experimental data for many years in academic settings. His applied and academic experiences provide a depth of knowledge that will benefit every aspect of our data strategy development. (Appendix D. Letter of commitment).

**D. Resources.** The project cost of $286,222 includes $142,836 requested of IMLS and $143,386 of non-federal cost share. The Museum's in-kind contribution is comprised of personnel at $106,195 (salary and fringe) and indirect costs totaling $37,191. IMLS funds would support staff training ($7,100); a consultant data scientist ($24,000); travel for two staff members each to five conferences, trade shows, and events ($15,665); registration fees for six conferences (one is located in Denver and will not require travel funds, $10,040); RFID hardware and associated set up costs ($25,000); two-year license for Azure cognition software ($24,000); and

associated indirect costs ($37,031). Depending on learnings from the training, consultation, and piloting activities, additional Museum resources (from operating budgets) may be contributed.

**E. Tracking progress.** The Data Team will meet no less than once per month as determined by agenda and tasks. This meeting time will serve as a natural time to track progress on the grant. The Data Team will provide monthly updates to the directors of all affected departments (including Marketing, Membership, Technology, and Guest Service) and the Project Director, either via email or communicated verbally in a formal meeting, as deemed appropriate. They are also responsible for submitting an annual report on their work to the Museum's senior leadership. The quarterly billing cycle provides another opportunity to compare budget to actuals.

**F. Dissemination of project results.** The PD and the Data Team will author a case study to share with other museums, zoos, aquariums, and other cultural venues looking to implement a similar data strategy. DMNS is part of an established network among Denver peer institutions that includes Denver Zoo, Denver Botanic Gardens, Denver Art Museum, and Denver Center for the Performing Arts. The technology teams of these institutions meet quarterly, and DMNS will share progress on this project. Members of the Data Team participate every year in the Gateway Ticketing client meeting and will share project details and results with other nonprofit clients at this gathering. The Data Team will also submit the project as a presentation or panel at a relevant conference focused on data analytics and museums. This activity will advance the professional development of DMNS Data Team members while disseminating project results.

## 3. PROJECT RESULTS

**A. Performance goals.** The project will meet the IMLS Performance Goal to "train and develop museum and library professionals." A survey instrument will be developed as part of the overall evaluation plan that will measure the extent to which the seven museum staff participating in professional development increase their understanding, interest, and confidence that they can apply their learnings as a result of the training.

Another performance metric that will be measured during the grant period is a decrease in the number of data issues. Issues range from data corruptions due to system synchronization processes to reporting issues caused by system configuration problems. Staff submit tickets in TRACKER, our data defect tracking tool. We currently see approximately 50 issues per week, and we anticipate reducing this number to 10 issues per week. This dramatic reduction in data issues would be a strong indicator of improved data integrity and would result in a decrease in expensive data cleanup, lower staff frustrations, and likely higher guest satisfaction.

**B. Intended results.** As a result of this project, DMNS will know much more about our guests' behaviors, including where in the Museum they go, dwell times, and what they purchase. This data will result in better understood audience segments. Long-term, this project has the potential to result in more favorable business outcomes including greater guest satisfaction, higher capture rate of marketing and promotions, higher visitor-to-member conversion rates, and higher member retention rates. Armed with a more detailed picture of our guests, we are also able to create experiences that delight, surprise, and bring personal relevance to each guest's experience. This guest focus enhances the Museum's value to the community we serve.

**C. Changes in knowledge, skills, behaviors, and/or attitudes.** By providing the conditions for more of our staff (beyond the typical data power users) to become more engaged with using technology and appreciating the value of data, we effectively generate systemic change in the institution. We adopt an organizational culture that leverages data – one that is efficient, guest-focused, and capable of real-time, data-based decision making.

**D. Tangible products.** Tangible products include the technologies deployed; such as RFID or other products which will remain stationed throughout the Museum beyond this project, as well as mobile apps or other products we develop. Another tangible product is the wealth of new guest data that will be generated.

**E. How benefit of the project will be sustained.** Training staff is an initial investment that sustains itself as there is no need to pay for ongoing consultations. Knowledge gained by staff, a data strategy informed by the consulting data scientist, and deployed data capture tools will continue to pay dividends for the Museum. Insights gained will change how we do business.

## SCHEDULE OF COMPLETION

| PROJECT YEAR | Pre-Grant | | Year 1 | | | | Year 2 | | | | Post-Grant |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CALENDAR YEAR | 2018 | | 2019 | | | | 2020 | | | | |
| QUARTER | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | |
| **1. Pre-Award Training and Project Development** | | | | | | | | | | | |
| Improve data integrity: Clean up existing report server, run audit reports, address process changes needed (Data Team) | | | | | | | | | | | |
| Participate in training on relevant business analytics tools (i.e. Power BI) (Data Team) | | | | | | | | | | | |
| Participate in training on data warehouse building concepts (Data Team) | | | | | | | | | | | |
| Conduct small scale feasibility testing on passive and active guest engagement data collection tactics (PD, Creative Tech Team, Data Team) | | | | | | | | | | | |
| **2. Project Implementation** | | | | | | | | | | | |
| Consult with data scientist on data strategy, goals, and tactics (PD, Consultant, Data Team) | | | | | | | | | | | |
| Establish a broad data strategy for the institution (PD, Consultant, Data Team) | | | | | | | | | | | |
| Participate in a data analytics trainings (Data Team members) | | | | | | | | | | | |
| Scan marketplace for innovative data analytics and digital guest experience enhancement ideas through participation in conferences, trade shows, and other opportunities (6 events total). (different members of Data Team) | | | | | | | | | | | |
| Develop and pilot key promising guest data capture technologies that help to complete our picture of a museum guest (Data Team, Creative Tech Team) | | | | | | | | | | | |
| Leverage data insights for specific projects (PD, Data Team, Exhibits, Guest Services, Marketing, Membership, and Finance) | | | | | | | | | | | |
| **3. Administration, Evaluation, and Dissemination** | | | | | | | | | | | |
| Initiate grant, set up project management and time tracking systems, establish team roles and responsibilities, initiate contract with consultant data scientist (PD, Grants Manager, Data Team) | | | | | | | | | | | |
| Communicate about priority data issues and solutions through regular Data Team meetings (PD, Data Team) | | | | | | | | | | | |
| Present learnings, findings, and ideas gleaned from conferences and events (Data Team) | | | | | | | | | | | |
| Establish baseline data for tracking metrics; design evaluation survey (PD, Evaluator) | | | | | | | | | | | |
| Analyze data from TRACKER on data issues (King-Miller) | | | | | | | | | | | |
| Administer evaluation survey and analyze and summarize results (Evaluator) | | | | | | | | | | | |

## SCHEDULE OF COMPLETION

| PROJECT YEAR | Pre-Grant | | Year 1 | | | | Year 2 | | | | Post-Grant |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CALENDAR YEAR | 2018 | | | 2019 | | | | 2020 | | | |
| QUARTER | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | |
| **3. Administration, Evaluation, and Dissemination, continued** | | | | | | | | | | | |
| Share project and results with Denver peer cultural institutions at quarterly technology staff gatherings (PD) | | | | | | | | | | | |
| Develop case study and share with other museums, zoos, aquariums, and other cultural venues (PD, Data Team) | | | | | | | | | | | |
| Submit a presentation or panel for a relevent conference (Data Team) | | | | | | | | | | | |
| Author progress reports for IMLS (PD) | | | | | | | | | | | |