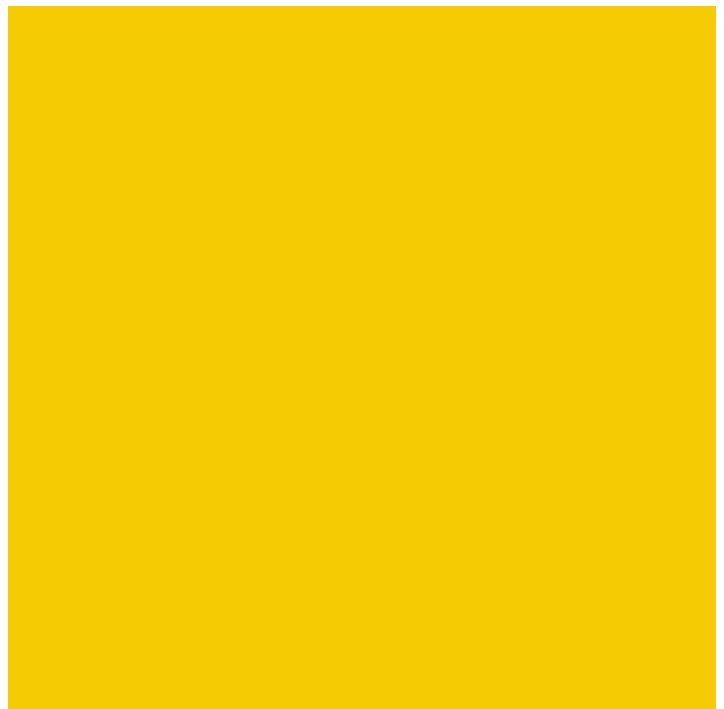


SCIENCE FESTIVAL ALLIANCE FROM 2009–2012



Key Findings of Independent Evaluation



Introduction

The Science Festival Alliance (SFA) is a growing professional association of independent science and technology festivals. Dedicated to encouraging and supporting both new and existing festivals, the SFA also works to foster an international conversation about how to make public science events more meaningful, entertaining, and instructive.

The SFA was established in 2009 through the cooperative efforts of four founding organizations: MIT Museum, Franklin Institute, University of California–San Francisco, and University of California–San Diego. A grant that year from the National Science Foundation provided three years of funding to support and evaluate four major science festivals in different regions of the United States and to establish the SFA as a national network. While the SFA now encompasses a wide range of activities involving many more festivals, this report presents the SFA’s accomplishments resulting directly from the original three-year grant.

The findings in this report derive from assessments made by Goodman Research Group Inc. (GRG), an external research and consulting firm in Cambridge, MA. GRG conducted a multi-method process and summative evaluation to measure the SFA’s success at meeting several key goals, including engaging hard-to-reach audiences in science education, and involving science, technology, engineering, and math (STEM) professionals in public outreach. Evidence of success was gained largely through surveys of public and professional audiences as well as reviews of SFA documents, conversations with SFA science festival team members, and participatory observations at SFA meetings.

This report summarizes the evaluator’s findings and presents relevant evidence to support GRG’s conclusions. While the findings are likely relevant to other science festivals, it is important to note that all data was collected at the Cambridge Science Festival, San Diego Festival of Science and Engineering, Philadelphia Science Festival, and Bay Area Science Festival, four independently organized initiatives that will be collectively referred to in this report as “SFA festivals.” To access the full report, please contact the Science Festival Alliance.

Online: www.sciencefestivals.org
Email: connect@sciencefestivals.org
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*Images from top to bottom:
San Diego Festival of Science
& Engineering
Cambridge Science Festival
Bay Area Science Festival
Philadelphia Science Festival*

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*Images from top to bottom:
Cambridge Science Festival
Philadelphia Science Festival
Cambridge Science Festival*



*Cover images from top to bottom:
Philadelphia Science Festival
Bay Area Science Festival*

About Science Festivals

Science festivals are public celebrations of science, technology, engineering, and math (STEM) that span several days to a couple of weeks. They usually involve many unique events in different venues across a community. Individual festivals vary greatly in scale, scope, and style. Typically, a science festival establishes a visible presence in a community and offers a wide range of activities and events that may include: large public expositions or carnivals; exhibitions, lectures, workshops, discussions, and debates; and both the performing and the visual arts.

A hallmark of science festivals is collaboration with a wide range of stakeholders in each community. Each celebration depends on scores of local collaborating organizations to provide programming and resources. Festivals build upon such collaborations to create well-managed local networks capable of presenting a large number of events in venues throughout a region. By generating so much activity over a short period of time, the science festivals are both showcases for existing informal science education (ISE) initiatives and living laboratories for new and innovative ISE programming.

Festival Attendance

Since its founding in 2009, the Science Festival Alliance has grown to include many members. For the purposes of this report, however, data is drawn only from the SFA's four founding festivals—Bay Area Science Festival, Cambridge Science Festival, Philadelphia Science Festival, and San Diego Festival of Science & Engineering.

These festivals all either met or exceeded their annual audience goals of 25,000-50,000 attendees. The festivals also achieved their secondary audience goals of 125-150 exhibitors, presenters, collaborators, and sponsors.

Estimated Festival Attendance

	2010	2011	2012
Cambridge	~40,000	~50,000	~40,000
San Diego	55,000	55,000	50,000
Bay Area	N/A	70,100	53,609
Philadelphia	N/A	124,500	91,500

Estimated Number of Exhibitors, Presenters, Collaborators, and Sponsors

	2010	2011	2012
Cambridge	200+	200+	200+
San Diego	143	135	146
Bay Area	N/A	300+	287
Philadelphia	N/A	176	185

Festival Fundraising

The SFA festivals studied each showed an annual increase in the percentage of their festival budgets secured from sources other than the National Science Foundation, including from festival donors and sponsors. The consolidating/maturing festivals, Cambridge and San Diego, have required proportionately less direct grant support than their new, startup counterparts. As the festivals reached the end of their initial 2-3-year maturation process, each was on track to operate without further federal grant support.

Percentage of Festival Budget Secured from Sources Other than the National Science Foundation

	2010	2011	2012
Cambridge	77%	82%	87%
San Diego	44%	61%	73%
Bay Area	40%	63%	69%
Philadelphia	45%	63%	63%
Total	54%	67%	73%

The Four SFA festivals

CAMBRIDGE SCIENCE FESTIVAL

www.cambridgesciencefestival.org

Inaugurated in 2007, the Cambridge Science Festival celebrates science and technology as an integral part of the culture of the region.

The festival's nine-day schedule features workshops, lectures, debates, exhibitions, concerts, and theater. Events—the majority of which are offered free of charge—range from a full-day Science Carnival to intimate talks, hands-on experiments, scavenger hunts, and tours. The huge number of activities makes it possible to appeal to many different target audiences, and the wide variety of venues brings the festival home for a broad spectrum of area residents.

The event draws between 30,000 and 50,000 annual visitors and often includes more than 200 events in venues across Greater Boston.



*Images from top to bottom:
Cambridge Science Festival
Cambridge Science Festival
San Diego Festival of Science
& Engineering*



SAN DIEGO FESTIVAL OF SCIENCE & ENGINEERING

www.sdsciencefestival.com

Launched in 2009, the San Diego Festival of Science & Engineering emphasizes events and activities for families with a mission of inspiring today's children to become tomorrow's STEM innovators.

The festival's eight-day celebration is bookended by two major events: Science Family Day, which reaches more than 10,000 attendees with STEM activities centered in Balboa Park's many cultural institutions; and EXPO DAY, which reaches more than 20,000 attendees with hands-on activities in San Diego's Major League Baseball stadium. Dozens of additional festival events, both small and large, take place throughout San Diego County during festival week. The festival also arranges scores of school visits by STEM professionals, inspiring kids and demonstrating that STEM careers are accessible routes to a better future.

The festival draws more than 50,000 attendees annually, drawing on collaborative efforts throughout the county.

PHILADELPHIA SCIENCE FESTIVAL

www.philasciencefestival.org

The Philadelphia Science Festival builds community around science, engineering, and technology by showcasing the role that each plays in the region.

Since its first celebration in 2011, the festival has served as a structure that enables every neighborhood of Philadelphia to host engaging, high-visibility science programming. The festival has experimented with both a 16-day and a 10-day schedule of events designed to excite the public with the wonders of science while also creating opportunities for serious conversation on STEM topics. At the heart of this effort are carefully coordinated collaborations that unite diverse civic, academic, scientific, corporate, and community organizations.

The festival reaches about 100,000 attendees each year. Launched with a major boost from National Science Foundation funding, the Philadelphia Science Festival has grown increasingly self-sustainable.



Images top and right:
Philadelphia Science Festival
Bay Area Science Festival



BAY AREA SCIENCE FESTIVAL

www.bayareascience.org

The Bay Area Science Festival engenders respect, support, and value for science as a cultural backbone of the San Francisco Bay Area.

The festival's 10-day schedule includes multiple Discovery Days (full-day main events filled with family-friendly hands-on activities) that are geographically distributed throughout the Bay Area. Scores of additional events, ranging from outdoor expeditions to sold-out stage shows, reveal science and technology to be a critical element of Bay Area culture and raise awareness of the importance of science in everyday life.

The festival reaches between 50,000 and 70,000 attendees each year with the help of collaborators from among the region's vast range of science and technology organizations.



Image left:
Bay Area Science Festival

Key Findings

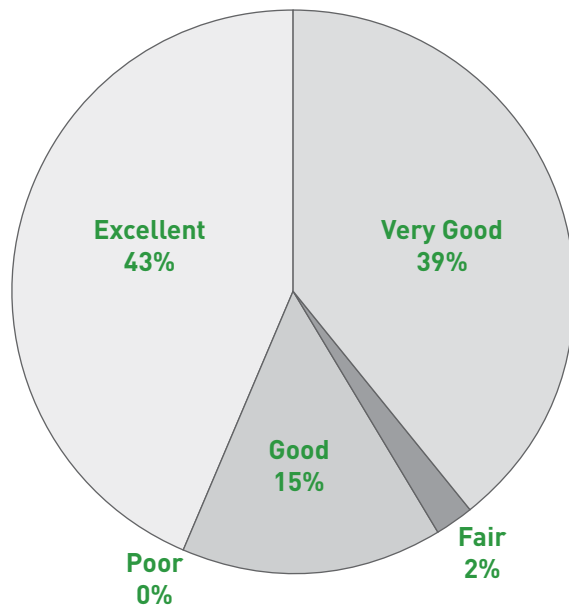
GRG's independent evaluation demonstrates that the science festivals studied show distinct strengths in the following four areas:

1. Overall positive impact on large public audiences
2. Effective outreach to underserved audiences
3. Direct involvement of STEM researchers and professionals in outreach
4. Creation of regional collaborations that lead to positive outcomes for informal science education professionals and organizations

Impact on Public

The GRG report found that participants at the SFA festivals had high-quality experiences in informal science education and reported becoming more interested in science, learning something new about science, experiencing science learning as more fun and enjoyable, and feeling more connected to the science happening in their cities. Overall, more than 80% of festival attendees rated individual events as *very good* or *excellent*.

The Quality of the Festival Experience



Science Festival Attendees' Ratings

Extent to which event ...	Mean (out of 5)	Percentage that reported quite a bit or a great deal of impact
Made science learning fun	4.00	75%
Helped attendees learn something new about science	3.90	70%
Increased interest in science	3.66	60%
Helped attendees connect to the science happening in their cities ^a	3.63	59%

^a Based on 2011 and 2012 data



LASTING RESULTS

GRG found a majority of attendees were motivated to follow up in some way on what they had learned at a science festival.

Percentage of Attendees Likely to Follow-up on Festival Experience

	Percentage likely or very likely
Talk about the festival with others	90%
Attend festival events again next year	84%
Look for information on something they learned about at the festival	79%
Take part in activities related to what they learned about at the festival	62%
Use information from the festival in their work/studies	51%

Note: These results are based on 2011 data, the only year in which these questions were included on attendee surveys.

Many returning festival attendees who were surveyed also reported they *actually did* follow up on their new experience in science. In 2012, a total of 277 visitors across all four festivals answered questions about their continued engagement with science following a science festival. More than two-thirds said the festival had inspired them to search for more information on a covered topic.

Percentage of 2011 Attendees Who Returned to Festival in 2012 and Reported Follow-up Behavior

	Percentage
Looked for information on something they had learned about at the festival	69%
Took part in activities related to what they had learned about at the festival	64%
Used information from the festival in their work/studies	58%
Followed up with groups or organizations they learned about at the festival	46%

Reaching Underserved Groups and Families

Science festivals are well positioned to support the participation of underrepresented groups and families in informal science education, according to GRG. While the evaluators found that all four of the festivals studied attracted more educated segments of the population, as well as high percentages of white visitors, they also found that more women and families attend science festivals than some other informal science settings, such as zoos and museums. Furthermore, of the minority members surveyed, more reported the festival had given them their first substantive interactions with STEM practitioners as compared to white visitors.

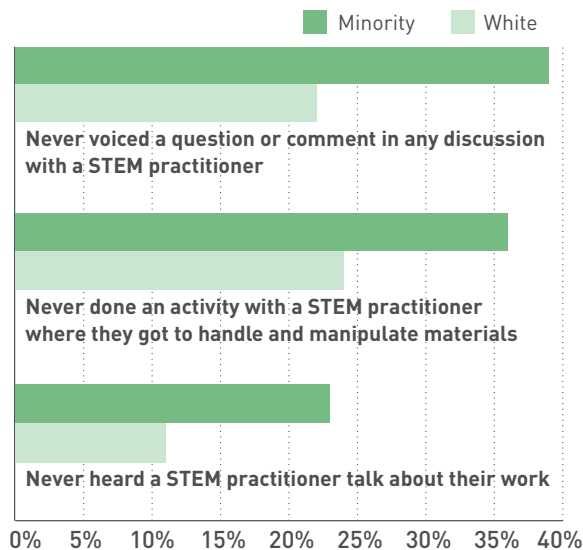
MINORITY ATTENDEES

Overall, a majority (62%) of attendees who completed GRG's surveys were white. Some festival samples were more racially diverse than others (46% and 44% for two festivals, compared to 28% and 33% for two others).

The San Diego, Philadelphia, and Bay Area samples also were comprised of higher percentages of non-whites over time: San Diego respondents were 38% minority in 2010, 50% minority in 2011, and 52% minority in 2012; Philadelphia respondents were 27% minority in 2011 and 37% minority in 2012; and Bay Area respondents were 39% minority in 2011 and 48% minority in 2012. Interestingly, expos/carnivals attracted a greater proportion of minorities than other events (47% compared to 33%, overall).

Most significantly, GRG found that of attendees surveyed in 2011, minorities were more likely than whites to report never having had substantive interactions with science practitioners of the type offered by the festivals.

Before Coming to the Science Festival



WOMEN AND FAMILIES

GRG's research also found that women constituted a slightly higher percentage of visitors to the four SFA science festivals than to some other informal science settings. For instance, 47% of the visitors to the Smithsonian science museums were female, compared to 55% of SFA festival-goers across the four SFA science festivals.

Family groups also constituted a higher percentage of visitors to science festival carnivals and expos than to many other informal science settings. GRG found 71% percent of SFA science festival carnival and expo respondents were attending with one or more children aged 5-16, compared to 43% of Smithsonian science museum visitors.

Overall, four in ten respondents (43%) had come to the festival as part of a family group (i.e., with one or more children aged 5-16); however, this percentage varied by type of event, by festival, and by year within two of the festivals.

Involving STEM Practitioners and Institutions

ABOUT STEM PROFESSIONALS AND COLLABORATORS

The four SFA festivals studied engaged a variety of science professionals and STEM practitioners as exhibitors, collaborators, and sponsors, and GRG conducted two years of surveys with these collaborators.

Across festivals, GRG found 25% of the collaborator representatives were non-white, and 37% of respondents were younger than 35. The highest percentage of collaborator survey respondents were informal science educators.

Roles of Collaborator Survey Respondents

	Percentage
Informal science educator	29%
K-12 science educator	10%
Science undergraduate/graduate student	7%
Professional industrial scientist	4%
University science professor	3%
Professional academic scientist	2%
Science journalist/media	1%
Other	44%



Image:
San Diego Festival of Science
& Engineering

INCREASED PUBLIC ENGAGEMENT

GRG found that STEM practitioners and their institutions benefited from new opportunities and increased confidence in reaching their target audiences through the vehicle of SFA festivals.

A large majority (75%) of STEM practitioners who exhibited and presented at the SFA festivals reported increased confidence interacting with public audiences as a result. There was also evidence of their increased engagement in public outreach through festival-related experiences. When asked, 75% of festival collaborators reported having previous experience with informal science education (ISE), while 25% were new to ISE. Thus, merely through partnering they increased their engagement in science outreach.

In addition, when asked to think about the upcoming year and their commitment to ISE beyond their science festival, 85% of collaborators said they were highly likely to contribute to local ISE efforts in the next year. Survey results revealed a driving interest and commitment to extend the circle of those who are effectively engaged in festival-related, year-round ISE initiatives.

POSITIVE FEEDBACK

The views of returning exhibitors, presenters, collaborators, and sponsors provide another key indicator of the SFA festivals' success. When asked in 2012 if they would participate in their city's 2013 science festival if given the opportunity, nearly all the collaborators (88%) asserted they would. GRG also found that within six weeks of the SFA festivals, many festival collaborators had reported developing opportunities for new alliances with local academic, civic, cultural, educational, or private collaborators as a result of the festival. About one in four received follow-up phone calls or emails from festival attendees, and about three in ten received visits or enrollments.

Supporting Informal Science Education Professionals

The Science Festival Alliance formally supported at least 31 science festivals in a variety of ways during its first three years, including assisting in the launch of festivals through advice and mentoring, facilitating relationships with national collaborators leading to specific public programs at festivals, helping festivals attract sponsors and gain visibility, and creating a network of linked festivals that assist one another with festival-specific issues. The SFA also brought together professionals from around the world and across disciplines for conferences, meetings, and workshops focused on new audiences, new venues, new collaborations, new formats, and new conceptions of success in science outreach.

GRG specifically evaluated two International Public Science Events Conferences (IPSEC) held by the SFA in 2011 and in 2012. The evaluators found that these events complemented—and in many cases added value to—public science event practitioners’ professional association activities.

The research provides evidence that the SFA’s conferences helped form connections and relationships among science festival organizers, STEM experts, and researchers and evaluators (including those from abroad). The conferences also provided opportunities for face-to-face networking between attendees that were likely to lead to greater

collaboration. Respondents mostly rated the range of attendees and the opportunities to network at the conferences as *very good*, and 88% said the conferences had either *quite a bit* or *a great deal* of impact on their forming new connections and relationships.

After the conferences, nearly three-quarters of respondents said they would *definitely* be following up with someone they met for the first time at IPSEC to obtain information and resources. Approximately three-quarters of respondents said they would *definitely* be following up with someone they met at IPSEC for the first time to share information and resources.

Extent to Which Conference Benefited Participants

Benefits	Some	Quite a bit	A great deal
Better understanding of how your work fits into a larger field	25%	34%	36%
New/improved conceptions of public engagement in science	31%	40%	26%
New/improved public science event practices	29%	45%	23%
Increased awareness of SFA resources/support	31%	37%	22%
Information/resources to start a new public science event	27%	44%	19%



Images top and left:
 San Diego Festival of Science & Engineering
 Bay Area Science Festival

Impact Related to Reaching Target Audiences

Benefits to conference participants	Some	Quite a bit	A great deal
Increased understanding of how to reach target audiences through public science events	39%	35%	17%
Increased understanding of how to impact target audiences through public science events	28%	37%	27%

THE EXPERIENCE OF THE FOUR SFA FESTIVAL DIRECTORS

GRG asked the directors of the four SFA science festivals to reflect on the most important ways in which being involved in the Science Festival Alliance had benefited their festivals. Several themes emerged. First and foremost it was clear that the SFA had created a supportive network of colleagues. The directors spent time together revamping programs, they discussed how to keep festivals fresh and exciting for collaborators, and they worked together on ways to engage corporate funders.

This professional community of practice, in turn, has put science festivals into a broader context and facilitated a general awareness of the science festival movement. Directors cited the IPSEC meetings, in particular, for their value in enabling festival personnel to meet face to face while discussing key hurdles for the movement. They also valued the opportunities they had through the SFA to visit other festivals and see new programming models in action.

Directors specifically cited the importance of the SFA in enabling them to gain access to national professional associations and other important organizations outside their own regions. The SFA accomplished this in part through speaking engagements at key conferences, such as meetings of the American Association for the Advancement of Science, the Association of Science-Technology Centers, and the Association of Science Museum Directors. These SFA engagements in turn led to individual festival engagements (sometimes in the form of sponsorship) with scientific societies.

A third way in which the SFA has benefited its founding members is by keeping on top of what is happening in the STEM world. GRG found the SFA has become a key source for festivals trying to keep abreast of the latest trends and concerns related to informal STEM education. The SFA has also provided directors with statistics and information on the national growth of festivals, information that can prove useful in attracting funders.



*Images above and near left:
Philadelphia Science Festival
Bay Area Science Festival*

*Images left and right:
Cambridge Science Festival
Bay Area Science Festival*



Conclusion

During the period covered by this report, 2009 to 2012, the Science Festival Alliance generated a remarkable amount of activity, not only in the success of its four founding festivals but also in the growth of the science festival movement as a whole. Staff working on both the SFA network and the four SFA festivals contributed enormous time and energy to assist not just each other, but new festivals just getting started. In turn, staff at those new festivals are now doing the same for others.

Goodman Research Group's independent evaluation found that the SFA has become a vibrant and increasingly connected network that is developing the types of resources in high demand from science festival organizers. This evaluation also revealed a great deal about the unique benefits of public science events, including:

- the potential of science festivals to make positive impacts on large public audiences;
- the ways in which science festivals can effectively reach underserved audiences not currently benefiting from other informal science education efforts;
- the importance of involving STEM practitioners directly in public outreach; and
- the benefits of massively collaborative events for the professionals and organizations involved.

In 2012 the SFA was awarded a three-year National Science Foundation grant to continue its work supporting festivals and developing resources related to all four of the categories noted above. It is clear that participation in the SFA benefits both new and existing science festival initiatives, but the lessons learned from the SFA project are also relevant to anyone working within the broader field of informal science education.

For more information, please contact the SFA at connect@sciencefestivals.org.



*Image above:
Bay Area Science Festival*



*Images above:
Cambridge Science Festival
Philadelphia Science Festival*



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Science Festival Alliance founding institutions include:



Evaluation: Goodman Research Group



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