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Science in the Sun: How Science is Performed as a Spatial Practice

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Science in the Sun: How Science is Performed as a Spatial Practice

by

Natalie Kass

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts
with a concentration in Rhetoric and Composition
Department of English
College of Arts and Sciences
University of South Florida

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DEDICATION

Sitting in one of our favorite restaurants devouring a big bowl of pho, the Pisces love of my life, Lucille Nguyen, convinced me to pursue a master's degree. She believed I could do it, so I did; her word was all I needed. Halfway through the program, I met Spencer Bennington, the yang to my yin and the fire to my water (hence, the steam). Without his support, love, and patience, I would not have finished. I dedicate my work to these two for they enrich my life daily by keeping it full of challenges, happiness, and laughter.

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ABSTRACT

This study analyzes how spatial organization impacts science communication at the St. Petersburg Science Festival in Florida. Through map analysis, qualitative interviews, and a close reading of evaluation reports, the author determines that sponsorship, logistics, exhibitor ambience, and map usability and design are the factors most affecting the spatial performance of science. To mitigate their effects, technical communicators can identify these factors and provide the necessary revisions when considering how science is communicated to the public.

SPACE, POWER, AND THE PERFORMANCE OF SCIENCE

Architectural structures impose meaning upon audiences. A sidewalk, for instance, instructs us to “walk here, do not walk there.” As Joddy Murray (2012) argues in *The New Work of Composing*, to walk into a space is to walk into a composed text to the extent that a text is composed for an audience and reflects the cultural attitudes and values of the author or designer. In an architectural sense, spaces can refine and promote cultural hierarchies, social status, and class identity. Take, for example, the different meanings connoted between a cubicle and a penthouse; the former represents the standard space of an average employee, whereas the latter represents the prestigious space of those wealthy enough to buy or rent it. As for sidewalks, they can designate certain paths for people and objects while limiting or constraining others. It follows that space is fundamentally rhetorical and inextricably tied to the power relations imposed upon those who occupy it.

The goal of this study is to uncover some of those underlying rhetorical choices and power relations at an important site for science communication in Florida—the St. Petersburg Science Festival (SPSF)—through a textual analysis of the SPSF’s brochures and logistics maps from 2011-2016, interviews with SPSF stakeholders, and a close reading of the SPSF 2015 Evaluation Report. Investigating science as a spatial practice at the SPSF illuminates how festival organizers chose to communicate science to the public, offering new ways for thinking about how those choices may affect future festivals or festivals nationwide.

THE SPSF AND SCIENCE AS A SPATIAL PRACTICE

The St. Petersburg Science Festival (SPSF) is an annual celebration of science hosted at the University of South Florida St. Petersburg (USFSP) waterfront campus. The festival—a non-profit organization started in 2011—attracts an estimated 20,000 attendees from all over the United States. The event takes place over two days, where the first day is a “Sneak Peak School Day” in which primary school students are invited to participate in small group lessons, while the second day is free and open to the public offering hands-on exhibits as well as live entertainment. The event is held in conjunction with MarineQuest (started in 1994), an annual open house of the Florida Fish and Wildlife Research Institute (FWRI). Both events constitute the SPSF that showcases roughly 140 exhibitors from local organizations with an emphasis in STEAM (science, technology, engineering, art, and math) learning. Specifically, the SPSF intends to create positive experiences with STEAM-related activities, increase the participation in STEAM-activities of children from underrepresented communities, and provide opportunities for research and science professionals to engage in public outreach related to STEAM careers and diverse research endeavors ([“Mission”](#)).

The SPSF is divided into zones and hosted mainly outside, hence its slogan “Science in the Sun.” Some zones, however, are hosted indoors. The zones form a U-shape around USFSP’s waterfront and, while visitors can enter through any zone, there are about four main entrances located near information booths. Each zone contains around 20-30 exhibitors placed under a single tent. Larger tents, however, house about ten different exhibitors from the same organization showcasing different (but related) activities. Activities range from hands-on to observational. For example, the [Great Explorations Children’s Museum](#) gives visitors the opportunity to create multicolored beaded bracelets that include UV sensitive beads to educate

about UV protection. The [USF CMS Electron Microscope Lab](#), on the other hand, provides a different experience by showcasing large posters of images captured on an electron microscope to educate visitors about microscopic marine ecosystems. All in all, as the festival provides food, entertainment, and activities for the whole family, visitors can attend the entire duration and find something new around every corner.

SCIENCE FESTIVALS AND SCIENCE COMMUNICATION

A “Science Festival,” as defined by Bultitude et al. (2011), should include the following characteristics (pp.167):

- A focus on “celebrating” science, technology, engineering, and related aspects
- An intention to engage non-specialists with scientific content
- A time-limit and recurrence, usually on an annual or biennial frequency
- A common theme and/or branding to component activities

The SPSF meets all of these criteria in that the first two characteristics are stated as goals on their website, it occurs annually, and the common theme is that all exhibitors demonstrate the ways in which science is a part of our everyday lives. Science festivals themselves provide a greater opportunity for “direct interaction between science and the public” (pp.169) and have become increasingly popular over the years (pp.175). Festivals simultaneously bind communities and offer fresh, constantly renewing experiences (Derrett, 2004). A festival is typically held in a “neutral territory” so as to provide an area where the public can feel more comfortable when experiencing an environment that is “more socially heterogeneous than normally experienced” (Landry, 2006, pp. 120). What’s more is that “festivals not only enliven space, but equally create a sense of place that may be exploited” (Rofe & Woosnam, 2016, pp. 347). In other words, the SPSF capitalizes on space provided by the city of St. Petersburg, an area that already

hosts a myriad of festivals, as well as space provided by USFSP, a satellite campus that hugs the Bayboro Harbor and provides a convenient access point for marine research.

Because the SPSF encourages community engagement, it has the potential to tap into the local interests of its citizens. This is an important detail when framing the public understanding of science (PUS) because the public's involvement with science hinges on the requirement that it is relevant to their ambient, everyday lives. At the SPSF, for instance, the public may share their concerns with scientists and scientists may share their research with the public. Without this contextual model, or, the "particular case of interaction between the public and science," we end up with what Gross (1994) calls the deficit model, or, a science that is isolated from the contexts that give it public significance. In this model, publics change their behavior when they are given facts. Scientific facts are imagined to "speak for themselves." Gross says this is a problem because it implies a passive public. In other words, science is seen as sufficient while the public is seen as deficient, meaning, there is a one-way flow from science to its publics (pp.6). But the SPSF provides a space where the public can be involved with "matters of concern," or, concerns that address the current state of affairs (Latour, 2004). Whereas "matters of fact" only include a partial part of experience, matters of concern frames the "data" of science as part of a multi-faceted rhetorical ecology saturated in affect ([Edbauer, 2005](#)). The SPSF connects points of interest related to science with the local concerns of a Florida audience. Sites and forums for public science, such as science festivals or science museums, lay the groundwork for how the public conceives not only of the scientific ideas under discussion, but of science itself (Schneider, 2009, pp. 9). Therefore, the SPSF is an important site for scientific communication that contributes to the shaping of public policy because it advocates matters of concern, or, the historical, material, social, economic, and technological practices that have gone into the making

of science displayed at the festival. By providing a space where interactions between scientists and the public can occur, the SPSF locates science within the cultural context that informs it, thus shifting from an *ideal* of science to an image of science *as a social process* (pp. 30).

FLORIDA'S POLITICAL CLIMATE

Much of the literature surrounding the rhetoric of science deals with what scientists think and do, whereas the public dimensions of the rhetoric of science, or, the ways in which science is accommodated for the public and how it is mobilized to persuade in a variety of forums, has been less developed (Schneider, 2009, pp. 8). Given that the SPSF is a free festival open to the public and rife with local organizations whose goals are related to advancing research in Florida aquatics, wildlife, and aerospace, this geographical location holds enormous potential for public policy making. For example, one exhibitor, [Imagine OUR Florida, Inc.](#), offered visitors a proposal to sign that would introduce bear-proof trash cans in all Florida counties that contain black bears. Another, [Sea to Shore Alliance](#), offered visitors an online survey (completed on an iPad) that automatically made participants members of the alliance for sea turtle conservation. These are just two examples from a festival full of exhibitors whose intentions were to influence public policy in some way, whether directly through the act of signing proposals or indirectly through involving more people with their cause. Therefore, an investigation of the SPSF will aid in our understanding of how festivals operate as a site for scientific communication and as an opportunity to shape public policy.

Florida, in particular, is a hotbed when it comes to public policy making. The peninsula state is home to the Everglades National Park and NASA's (National Aeronautics and Space Administration) Kennedy Space Center. These destinations have boosted Florida's economic value and generated political interest at both the federal and state level. As such, Florida has had

a long history involving the intersection between science and politics. For instance, there has been much attention paid to the ecosystem management of Florida with an emphasis on water sustainability (Harwell, 1997; Graf, 2013; Fuller, 2011). It comes as no surprise that the SPSF should be hosted in a region rich with research in water conservation and marine science. For these reasons, I investigate the SPSF as a specific case study that reveals the “social and material conditions necessary for the production of scientific knowledge” (Collier, 2005). A deeper look into these conditions, i.e. the organizational structure of science festivals, will provide a better understanding of how these spaces bring scientists and the public together to bridge the gap between science communication.

RHETORIC AND VISUAL REPRESENTATIONS OF SPACE

Through map analysis, this study investigates science as a spatial practice that impacts science communication. Space exerts power (Foucault, 1984, pp.252), and maps mobilize some facets of power in a location. Visuals forward agendas, whether implicit or explicit. For example, Welhausen (2015) showed how yellow fever maps from the 18th century shaped public understanding of the disease. More mundanely, popular global maps use a [Mercator projection](#) that distorts the size and orientation of land masses. Such maps are useful for maintaining a constant course at sea, however, they make land masses closer to the poles—the United States, Greenland, and Europe—appear larger than those near the equator—Central Africa and South America—making them seem more important. It is clear, therefore, that visuals can influence knowledge about a particular subject, such as diseases, groups of people, or science. The way we create visuals, such as maps, can “transform general knowledge into specific information” and “link knowledge and space,” therefore, the way visuals are created influence the way we perceive the world (Welhausen, 2015, pp. 264). This is important in professional and technical

communication because visuals can exert power over populations, power such as control and ownership and, in Welhausen's case, containment. Delineating zones, in the SPSF's case, or academic disciplines can lead to assumptions about power, funding, and legitimacy (Sullivan & Porter, 1993). Thus, technical communicators must consider the implications of the visuals they create, as do designers of the SPSF maps.

The SPSF's organizational structure—or, its “floor plan”—is an inherently rhetorical endeavor because it forwards a particular image of science (Schneider, 2009). In other words, because the festival organizers had to make decisions about where to place exhibitors throughout the festival, they were also making decisions about what is being seen and read as important and true in the discipline of science. Mol (2002) contends that the practices of science and the particular enactments of it shape the way it is seen and understood. When looking at the ways arteriosclerosis was enacted in different departments throughout a single hospital, Mol found that the disease meant completely different things to different practitioners because of their unique ontologies (55). In other words, because physiologists, surgeons, and physical therapists bring different educational backgrounds, tools, and discourses to their practice, they diagnose and treat arteriosclerosis differently. Applying this to the SPSF, the different factors allowing certain enactments of science while disallowing others can ultimately influence the way science is understood and treated. For example, does placing an exhibitor outside with the majority of the festival make it seem more important than those placed inside? Does giving an exhibitor a larger space attract more visitors and make the science seem more “true”? MacDonald (1998) explains how other informal science venues—like science museums—do not simply put science on display, but rather create a particular kind of science—a matter of concern—for the public by including certain artifacts as belonging to the proper realm of science and as science that the

public ought to know about (2). Silverstone (1994) furthers this notion by claiming that when museums, galleries, or exhibits are read as texts, they are structured according to a rhetoric which seeks to persuade the visitor about a particular image of science (166). For these reasons, I examine the SPSF's floor plan using its maps to uncover the rhetorical choices made by its organizers in presenting a particular image of science to the public.

While previous studies have explored how museums and their exhibits are read as texts, they mainly focused on the museum and accompanying exhibits as a package deal containing the labels in exhibits, activities for visitors, and spatial organization of the museum (Schneider, 2009; Ravelli, 2006; Silverstone, 1994; MacDonald, 1998). Further, most festival literature deals with the benefits and detriments of hosting these large events in urban centers (Rofe & Woosnam, 2016; Derrett, 2004; Landry, 2006), and investigations of specific "science" festivals only report their characteristics by the numbers (Bultitude et. al, 2011). Adding to this scholarship, I position my study to analyze the textual artifacts and narratives surrounding the SPSF to understand how space affects the performance of science, an aspect that is important to consider when analyzing how science is communicated.

The factors I investigate pertain to the reasons why exhibitors were placed in one location over another. *Apparent factors* included space and technology requirements. For example, some exhibitors needed to be placed outside because they showcased messy activities like exploding volcanoes and sea creature touch tanks. Others, like the [Saint Petersburg Astronomy Club](#), needed the sky for their telescopes, therefore, they could not be placed inside. While some exhibitors clearly needed to be placed inside for electricity requirements, like the [STEM Sim Ex](#) simulator experience, others managed outside with a generator. Discrepancies like these make up the *unapparent factors*, or, the organizational reasons behind exhibitor placement. For instance,

were exhibitors grouped by subject? Did they compete for space through early registration or by paying extra money? For these answers, I turned towards the interview data.

METHODS

This study examines the longitudinal factors influencing the spatial practice of science at the SPSF. Specifically, I address the research questions:

- How does space affect the performance of science?
- What factors are shaping science as a spatial practice at the SPSF?
- How did those factors shift/develop over time?

To answer these questions, I examined the SPSF's brochures (accessible online) and logistics maps (provided by the SPSF Program Committee) from 2011-2016 to determine how geographical space affected the performance of science over time.

The SPSF brochures were about letter-sized and split into a tri-fold. The top-inside displayed a map of the festival divided into zones. An iconographic legend denoted some science festival activities spread throughout those zones. The bottom-inside contained a list of all featured exhibitors, numbered and divided into the respective zones where they could be found. MarineQuest exhibitors were listed on the outside, along with general festival information, like date and time, and partner and sponsor logos ([see Appendix B for a 2014 example](#)). Since the brochures were made for public consumption, they did not list specific exhibitor locations or sizes within zones. To answer my third research question, I needed to know how certain exhibitors shifted in and out of spaces over time and why, so I looked towards the logistics maps offered by the SPSF Program Committee to fill in those gaps ([see Appendix C for a 2016 example](#)).

To find out *why* exhibitors were placed in the spaces that they were, I interviewed festival organizers from both the SPSF and MarineQuest. The qualitative interviews provided me with information not available from the maps, such as whether or not exhibitors competed for space, how the needs of exhibitors (e.g. technology and space requirements) were met, and how those factors shaped the structural organization of the SPSF. Additionally, I interviewed representatives from four 2016 exhibitors whom I chose because, as they were placed in different areas, could offer different experiences regarding visitor traffic or general thoughts about their placement. The interviews traced spatial and temporal narratives about the festival, so I discuss my interviews results as part of a story network analysis (Boje, 2001). The following people are quoted:

SPSF

- Rutherford, Founder and Co-Chair
- Burress, Co-Chair
- Dornberger & Venturelli, Program Committee Chair and shadowing Co-Chair

MarineQuest

- Pernell, Public Outreach and Logistics Organizer

2016 Exhibitor Representatives

- Dr. Rajiv, Pure Air (located outside by main entrance point)
- Greco, Electron Microscopy Lab at USF CMS (located inside)
- Benefiel & McCallister, Girl Scouts of West Central Florida (located outside with open field behind)
- Cuffaro, Museum of Science and Industry (located outside by food vendors)

Each group received different questions ([see Appendix D for a complete list of interview questions](#)). Initially, I thought that MarineQuest¹ and SPSF collaborated to design the festival space, but after interviewing Pernell, I learned that their long-running event retained full control over exhibitor placement in their zone. Therefore, I narrowed my focus on zones controlled by the SPSF. Pernell still provided historical information about the partnership between MarineQuest and SPSF. Rutherford, as founder of the SPSF, also provided a detailed historical narrative of the festival's beginnings, goals, and funding sources. For instance, because Rutherford and Burrell co-chair the festival, I thought they played a role in actual exhibitor placement. However, both said this was the job of the Program Committee, so I created new questions for them that hadn't already been answered by the co-chairs. Lastly, my questions for exhibitors were designed to understand how their provided space affected their exhibits.

Interview data was supplemented with the 2015 SPSF Evaluation Report created by Karin Braunsberger, Professor of Entrepreneurship, and Kate Tiedemann, College of Business, at USFSP. This 28 page document was provided to me by Co-Chair Burrell, who said it was part of a national effort to evaluate the SPSF and 25 other national festivals. The evaluation report includes data collected by SPSF volunteers who administered surveys to visitors (adults and children alike) using iPads on the day of the festival. The report includes internal evaluations with festival exhibitors and volunteers. It recommends improvements for the logistics, technical issues, visitor experience, exhibitor experience, and volunteer experience of future events.

¹ Given the SPSF's conjunction with MarineQuest, I contacted the FWRI to learn more about their event's placement practices. I found early on that MarineQuest retains full control over exhibitor placement in their zone but that, to the public, all zones appear as a part of one, continuous festival. Therefore, I focus my study on the SPSF as a whole. Still, it is important to note that MarineQuest has held their annual open house since 1994 while the SPSF wasn't introduced until 2011.

I also attended the 2016 SPSF festival. My observations added an in-person understanding of the festival. Through the maps, interviews, and report, I developed a strong sense of the festival's activities. The interviews especially helped identify a web of unseen actors. With the evaluation report, I was able to see the ways the SPSF was evaluating itself and how it planned to change in the future. Collecting data from these three sources provided data to understand the story network. Research questions were answered through narrative analysis that synthesized the mixed data sources.

ETHICAL TENSIONS

As I listened to the stories from different stakeholders in the SPSF, I began to question my role as a researcher in providing information that could improve science communication while, at the same time, protected my research participants. It was not my intention to damage the image of any organizations my interviewees represented. Because of this concern, I obtained permission from interviewees to use names and organizations in my research report.

ANALYSIS AND DISCUSSION

Factors that had the greatest impact on the spatial performance of science at the SPSF included sponsorship, logistics, ambience, and brochure UXD (usability and design).

SPONSORSHIP

Sponsorship can take several different forms when it comes to supporting the SPSF, including, “providing a location or content, event planning and coordination, marketing services, and financial as well as in-kind sponsorships” (“[Partners & Sponsors](#)”). Depending on what dollar amount sponsors donated, they were awarded different sponsorship levels—platinum, gold, silver, krypton, and titanium—which could include different perks, such as name recognition on event materials, media coverage, and preferred exhibit space (see [Appendix E](#)).

Concerning space, one ruling factor was that big sponsors got big spaces. When analyzing the 2016 logistics map, sponsors were easily identified by larger spaces on the map. For example, Figure 1 highlights several large sponsors grouped together under large tent spaces. The standard tent space provided for regular exhibitors was 10x10 ft, but these sponsors are shown to have tent spaces ranging from 20x40 ft, 30x40 ft, and 40x50 ft.

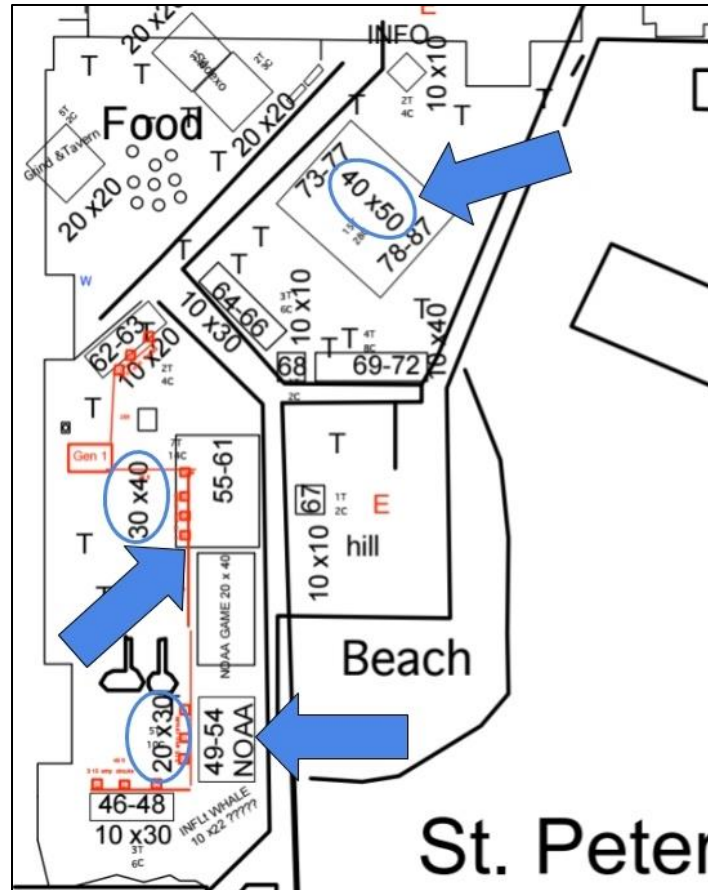


Figure 1. SPSF 2016 Logistics Map: Big Sponsors Get Big Spaces

According to the 2016 brochure, these spaces belonged to exhibitors #49-54: the National Oceanic and Atmospheric Administration (NOAA), a platinum level sponsor; exhibitors #55-61: the USF College of Marine Science, a gold level sponsor; and exhibitors #73-87: a combination of the USFSP Environmental Science & Sustainability Club, a titanium level sponsor, and the USFSP Department of Biological Sciences, not listed as a sponsor, but grouped together because of similar affiliations and activities. On the other hand, exhibitors #62: the Museum of Science and Industry, and #63: the University of Florida's Institute of Food and Agricultural Sciences, were allotted standard tent spaces and left off to the side. Money made a difference in the space exhibitors were given.

These large sponsors have the ability to shape the festival in several ways. For one, the sheer size of their tents can attract visitors to them while deflecting interest from other, smaller tents. As Bowker (2005) explains, when classifying sets of data or species, we tend to invest more interest in those that are more “charismatic,” or, those that are more exotic or exciting. The large, sponsored tents at the festival have the ability to garner such excitement because visitors can interact with multiple experiences happening all around them in one area. This was particularly noticeable for one silver level sponsor, Eckerd College, who, under a 40x40 ft tent, showcased touch tanks full of sea creatures for visitors to interact with. According to festival co-chair, Rutherford, Eckerd College is one of the better exhibitors because they provide a science that is interactive and causes kids to say “Hey, that’s pretty cool.” Another way big sponsors shaped the festival was by creating themes for branding what they do in the community. For example, with a bigger presence, Eckerd College asserts a marine science theme in their space. Yet, both co-chairs, Rutherford and Burrell, have considered creating their own themes for what science should be at the festival. For instance, there could be a “science of sports” or an “alternative energy” themed tent but, “because of the way the sponsorships come in, primarily the big ones, those are the themed pavilions” (Rutherford).

While, on the one hand, generating excitement meets the SPSF’s first goal of “providing a positive experience with STEAM-related activities,” it can exclude other exhibitors who don’t have sponsorship dollars to “buy” a larger space which generates excitement or establishes a theme. When these “noncharismatic,” or, mundane exhibitors aren’t paid attention to, their science could be perceived as less valuable. If a certain type of science is seen as less valuable, it may not be able to acquire as much funding for continued research, as in the case of oceanic

biota which receives more funding than oceanic viruses, for instance (Bowker, 2005, pp. 148). Without continued research, that particular science could disappear.

LOGISTICS

Logistics considerations included both the needs and requests of exhibitors as well as available terrain. Exhibitor needs and requests were met by completing the online registration form located on the SPSF website upon initial exhibitor registration. The form includes questions like:

- Who is your target audience?
- What does your festival activity feature?
- Are there any safety issues to be considered?
- Does your exhibit require access to electricity and/or water?
- Does your exhibit require inside or outside space?
- Do you need additional accommodation or have further logistical needs?

Needs typically depended on the activities they exhibited. For example, exhibitors that used prosthetics, like the fighting robots, had to be placed inside so that the moisture outside would not damage their parts. On the other hand, the astronomy club had to be placed outside, unobstructed by trees, so as to point their telescopes at the sky. The type of activity also determined what icons were placed on the map so that visitors could decide where they wanted to go based on their interests and the icons. I discuss implications of icon usage further in brochure usability and design.

In addition, available terrain dictated where exhibitors could be placed. As the size of the festival increased over time, so did the space needed. Year one's soft launch in 2011 only used the lawn outside Bayboro Hall on USFSP campus, whereas subsequent years extended beyond

USFSP property and onto city property, namely, Poynter Park. Such an arrangement elicited negotiations with city officials, hence, the liaisons. Hosting the festival on city property involved different rules which most directly affected food vendor placement. As Burrell explained, “food vendors have contracts, so we can only have those food vendors in certain areas, but the festival includes city property where we can contract any food vendors we want.” As brochures 2012-2014 indicated, food was available on the left-hand side of the map, or, on city properties (6th street and Poynter Park), while 2015-2016 included more food options between Davis Hall and Coquina Hall. I discuss implications of food vendor placement further in the next section on ambience.

The availability of certain terrains shifted over the years. For instance, Rutherford noted that “when Harbor Hall was open, which was the old Dali [museum], it made sense to wrap [the festival] around the entire Bayboro Harbor. It’s since been converted into classroom space and other types of space, but we needed a large indoor area so we moved up to the university hall.” Figures 2 and 3 show this shift from 2014 to 2015 when construction began in Harbor Hall.



Figure 2. SPSF 2014 Brochure: Harbor Hall in Use



Figure 3. SPSF 2015 Brochure: Harbor Hall under Construction, University Center in Use

AMBIENCE

Ambience, as I use the term here, refers to the surroundings of a particular exhibitor and the different ways in which those surroundings influenced it. An exhibitor's ambience was contingent upon where and how it was placed within each zone at the festival. The most common themes heard throughout interviews with exhibitor representatives produced the following considerations:

Was the Exhibit Inside or Outside?

Exhibitors placed inside had a harder time getting found in the first place. Most visitors who went inside were actively seeking certain exhibitors, otherwise, it was difficult to direct traffic not just inside, but up the stairs, too. In fact, some participating exhibitors who were outside didn't even know there was an inside portion! Rutherford expressed his eagerness to have the entire festival outside because "when you move it inside, it turns into a trade show....But you go outside, and there's a lot of energy, there's this energy you can't explain." Still, as mentioned earlier, there had to be an inside option for those exhibitors who needed to be inside based on their activity or equipment.

Was the Exhibit Near an Entry Point?

While the entire festival was open to access from any point, formal entry points were marked by information booths (see Figure 4).



Figure 4. SPSF 2016 Brochure: Main Entry Points

As one might suspect, being placed near an entry point gave exhibitors a better advantage for meeting with visitors to share knowledge and research related to their organization. As previously mentioned with big sponsors, proximity to entry points were another way exhibitor placement could be skewing our knowledge about what is important versus what is left out.

Who Were the Adjacent Exhibitors and What Were Their Activities?

Since the Program Committee decided where exhibitors were placed, and not the exhibitors themselves, they were subjected to the effects of those around them. For example, while the Program Committee decided to put the Girl Scouts and the Boy Scouts together because their “theme matched,” in reality, these organizations have little crossover. What’s more, because the Girl Scouts exhibit was decorated and the Boy Scout’s exhibit was not, the Girl Scouts noted that they probably recruited the visitors that the Boy Scouts otherwise would have.

Were There Nearby Food Vendors?

On the one hand, food had the potential to draw visitors into zones where it was located, effectively directing traffic to exhibitors also located in those zones. On the other hand, food had the potential to hinder exhibitors in those zones because either a) food distracted interest from exhibitors or b) the smoke produced by food vendors created a harsh environment within which to breathe and speak, as Cuffaro, whose exhibit was located near food vendors, explained.

How Much Sidewalk Space Was Available to Get to the Exhibitor?

Over the years, the festival has had to rearrange repeating exhibitors who generated so much traffic that it blocked walkways. For example, 2015 hosted a birds of prey exhibitor that ended up attracting many visitors. The exhibitor was surrounded by the buildings behind it and the Bayboro Harbor in front of it, therefore, the only way to get to it was by the small sidewalk which caused a bottleneck effect and blocked visitors from passing (see Figure 5). On the other hand, some exhibitors were placed with a large, open field behind them that they used to their advantage for activities during the Friday Sneak Peek School Day.

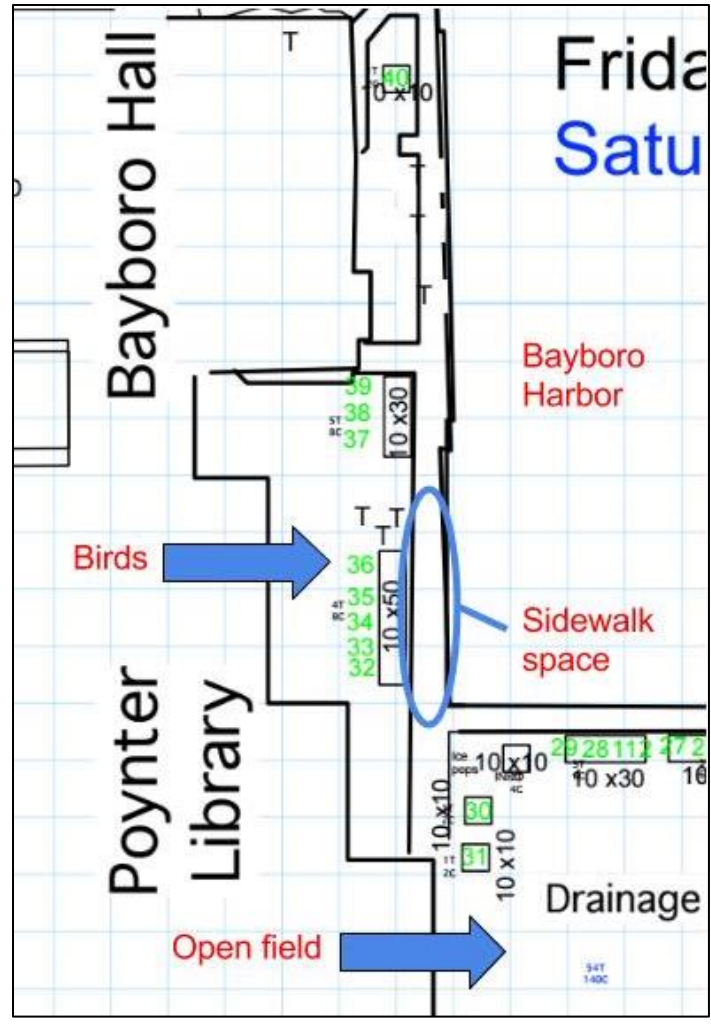


Figure 5. SPSF 2015 Logistics Map: Sidewalk Space versus Open Space

Which Direction Was the Exhibit Facing, or, Was It Placed on a Corner?

The orientation of an exhibitor had direct impacts on space and power. Depending on what direction(s) the flow of traffic was coming from, both exhibitors and visitors had to make choices about which direction(s) they would or could approach each other. As Cuffaro noted, whose exhibit lies at the intersection of the arrows in Figure 6 below, “On a straight walkway you have to face a single direction and you don’t have to choose where you’re going to face. But if I’m on a corner, I have the power to choose where I’m going to face, therefore, I have to ignore people on my right and if kids want the experience, they have to come in front of me.”

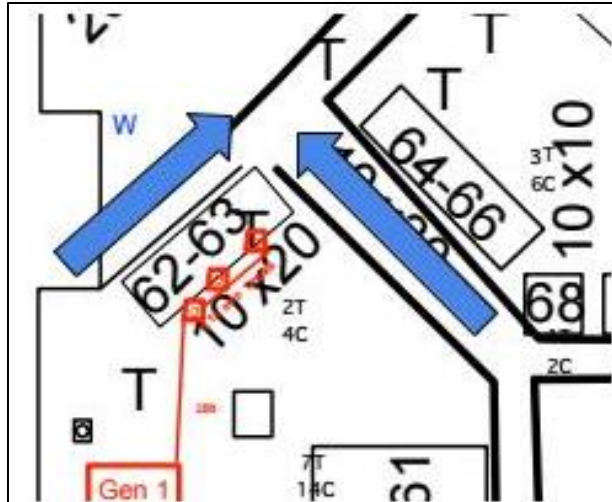


Figure 6: SPSF 2016 Logistics Map: Close-up of Traffic Based on Exhibitor Orientation

Exhibitors placed on corners had different power relations with visitors than exhibitors placed on straightaways because corner-exhibitors possessed multiple spaces for interacting with visitors. When confined to a straightaway, though, participants had a smaller space within which to make decisions, participate, and create knowledge about science.

Prime Real Estate and Competition

The factors described above have led exhibitors, both new and returning, to compete over what I call “prime real estate,” or, desired space at the festival. An exhibitor’s ambience could have great impacts on their ability to reach visitors and share research and information about their organization’s science. These external factors have led some exhibitors to use competitive strategies upon registration, namely, early registration, to secure prime real estate.

BROCHURE USABILITY AND DESIGN

There were two sets of maps used by two different audiences: the SPSF brochures used by the public to navigate the festival and the logistics maps used by the Program Committee during exhibitor placement planning. I examined both sets of maps to gain a better understanding of the “behind-the-scenes” look of the festival layout as compared to the final product the public

saw. I supplemented my analysis with interview data to gain multiple perspectives on organizers’ “thoughts and opinions about how the maps were organized” before asking more structured questions that could have influenced their answers. The top two themes I heard were that the maps were organized to promote simplification and diversification.

Simplification and Diversification: For Whom?

The most notable change to SPSF brochures occurred between years 2012 and 2013 when organizers changed the map design from individual tents to generalized zones and added subject area icons to indicate what type of activity could be found there (see Figure 7).

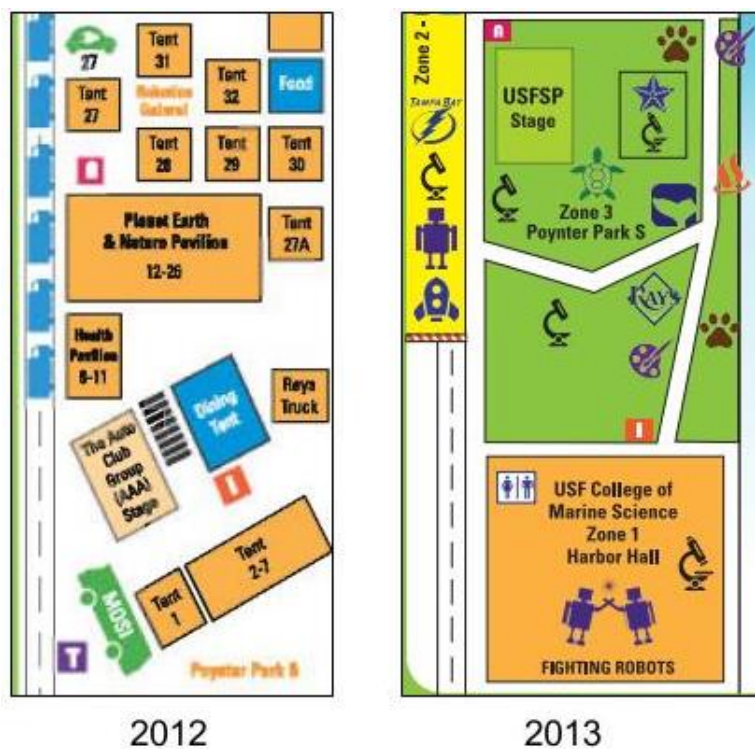


Figure 7. SPSF 2012 and 2013 Brochures: Tents to Zones and Icons

Organizers reasoned that the new design was more simplified. A more simplified version could make the festival space seem more transparent, less complex, and therefore manageable. In other words, the manageable space could empower visitors previously daunted by individual tents to think “Hey, I could walk this.” However, as Kimball (2006) writes about early 20th century

visual representations of London poverty whose design was rhetorically ambiguous, such transparency falsely empowers the viewer into thinking they can penetrate the “reality obscured beneath them” (362). In reality, each zone still contained 12-18 numbered exhibitors whose order and specific locations were now ambiguous. We can trace this false sense of empowerment to 2015 where, in the evaluation report, visitors recommended the SPSF “provide a less confusing, more detailed map to visitors” (Braunsberger & Tiedemann). Clearly, map design affected visitor experience, therefore, as Kimball suggests, we should analyze from whose cultural viewpoint we construct maps. While SPSF organizers believed they were simplifying the design for one demographic of visitors—for instance, families trying to read the brochure and make sure their 4 children don’t run off—they may have effectively made it more difficult for another demographic of visitors—for instance, single researchers seeking out individual tents who now have to hunt through large, generalized zones—to find what they’re looking for. The same problems arise with icon placement because visitors might have different interpretations of what icons—like paw prints, microscopes, and turning gears—represent.

EVOLUTION OF PLACE AT SPSF

Factors affecting the spatial performance of science at the SPSF changed over time based on evaluations and experience as well as establishment and popularity. Over time, the festival learned from its mistakes, both from internal evaluations and external evaluations with visitors, to foster more effective management and provide better experiences. Additionally, with each year the festival gained more ethos and attention which attracted more visitors, thus shifting the needs of the festival, particularly regarding space requirements.

Evaluations and Experience

After 6 years running, the SPSF had learned a lot by doing. For instance, as in the case of the birds of prey exhibit that caused traffic jams, the organizers learned *not* to place them there for the next year. Otherwise, returning exhibitors generally got the same spaces they were last year because it was “easier for everyone” (Venturelli & Dornberger). Because returning exhibitors were already in the SPSF membership system, they were also notified about opening registration *before* new exhibitors. Knowing about registration dates earlier could have ensured returning exhibitors got the spaces they wanted. Participation in the Friday Sneak Peek Day also ensures exhibitors do not have to move their exhibit on Saturday for the public exhibition, a recommendation from the 2015 Evaluation Report (pp. 27).

The evaluation reports served as “a tool with which to think,” a description Bowker (2005) applied to memory practices that frame the present in a particular way. In the SPSF’s case, evaluation reports construct a framework of thinking that guides how planning for the next festival takes place. The evaluation reports included questionnaire responses from visitors (broken down between children and adults), exhibitors, and volunteers, that collected data “to aid in the planning and implementation” of successful, future festivals. Very particular kinds of questions are asked which may be skewing our knowledge of how science is performed at the festival. Bowker explains that the things which can be represented are those that get counted, measured, protected, and saved, effectively stripping “economic, aesthetic, or philosophical importance” from those that are not (153-4). A particular instance of where this breaks down is in the volunteer training aspect on the evaluation reports which asked volunteers about their experiences during required training sessions prior to the festival. The report notes that this information was “particularly important for evaluators, because they had to be trained to use the

iPads and the software for data collection” (21). However, Co-Chair Rutherford noted that volunteers collected varying levels of results when it came to approaching visitors to take the questionnaire because some volunteers were more outgoing than others. Yet, the evaluation report does not ask about comfort levels or interpersonal competencies of its festival volunteers and is rather interested in volunteer ability to use the survey technology. This focus on technological competencies over interpersonal competencies suggests what is economically, aesthetically, and philosophically valued by the festival. If the festival wants to collect a more complete, inclusive picture of its volunteers, however, perhaps the evaluation reports should include questions related to the more subjective, overlooked areas.

Establishment and Popularity

The longer the festival was established, the more visitors it attracted. The more visitors it attracted, the more exhibitors wanted to participate to reach those visitors and interface with the public. Increased attendance records and exhibitor participation brought about an increased need for larger space. As a result, the festival expanded into several spaces, including a larger portion of USFSP property and city property (see Figure 8).

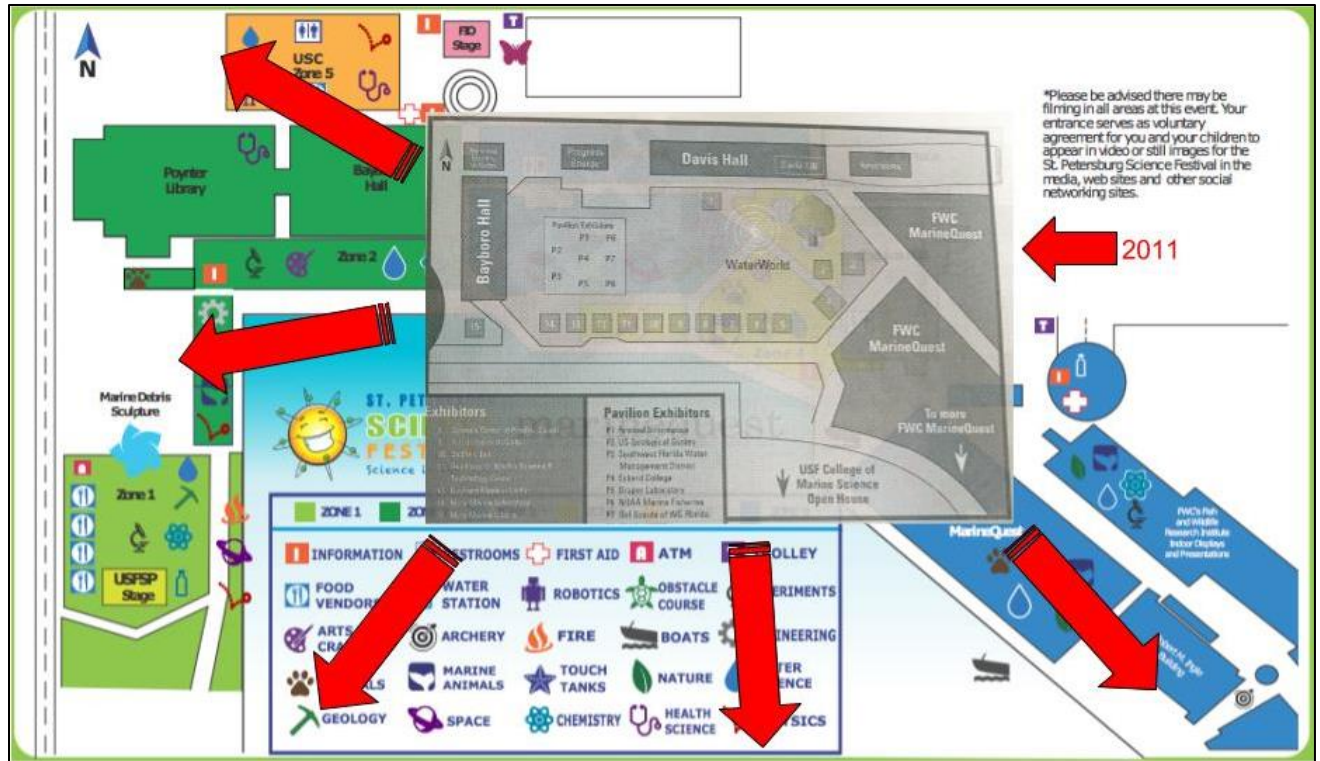


Figure 8. SPSF 2011 Brochure Overlaying SPSF 2016 Brochure Showing Growth

The larger the festival gets, the more considerations organizers will have to make in either negotiating for more space or being more selective when it comes to which exhibitors will be allowed to participate.

FINDINGS FOR PUBLIC SCIENCE

There are many audiences being coordinated through the planning, execution, and post-processes of the SPSF. These include committees within the SPSF's steering committee and festival volunteers, visitors, and exhibitors. Each are affected by how science is communicated at the festival.

BEING AT SPSF

An awareness of core SPSF audiences as they relate to the factors of sponsorship, logistics, ambience, and brochure UXD can bring about a different kind of being at the festival. Technical communication strategies can improve places where communication breaks down or is left out.

Sponsorship: Addressing an Organization's Goals

Technical communicators can address discrepancies between multiple audience's needs. As symbolic-analysts, (Grabill & Simmons 1998), technical communicators occupy multiple positions to "enable users to participate in decision making [as] an attempt to frame how institutional space can be created" (1998, pp. 437). In the SPSF's case, access to certain spaces contributed to different power relations between visitors and exhibitors, thus affecting the ways in which groups participated in particular kinds of science. Because big sponsors got big spaces, visitor traffic may have flowed in their favor. However, instead of placing big sponsors in larger spaces, perhaps organizations with similar goals, like entertainment, education, or marketing, could be grouped together so that the goals of one would not overpower the goals of another simply because of space. By working together towards a common goal, exhibitors may stand a

better chance at achieving it. These new “zones” might attract visitors based on objective standards, rather than disproportionate, financial ones.

Technical communication highlights the missions and goals of involved stakeholders, who their intended audiences are, and what they hope to accomplish (Youngblood, 2012), providing important perspectives for SPSF staff who have varying levels of expertise and time constraints. The work of a technical communicator provides the necessary movement to address the various goals of exhibitors, visitors, and SPSF Steering Committee members to reach a more balanced organization for the festival.

Logistics: Exhibitors and SPSF Pedagogy

The 2015 Evaluation Report commented that “some organizations do not have education staff and would appreciate help writing up science standards” (17). In Rutherford’s view—working from literature by Dierking & Falk (2006)—those science standards should concentrate on about two to three take-home messages for visitors, rather than try to encompass more than that like some exhibitors do. However, nowhere in the online registration form does it offer a space for exhibitors to ask for help writing science standards. As part of logistics gathering, technical communicators could revise the online registration form to better address the needs of both the exhibitors and SPSF preferred teaching styles. To offer a starting point on the registration form, one question asks exhibitors to mark the box next to what role best describes them. Five are academic, three are professional, and one is other, yet, the following question asks about safety issues. Here is a particular point at which, based on what role an exhibitor chooses, another box could appear on the form that asks an exhibitor if they need help with teaching science standards. Alternatively, Rutherford proposed a technical communicator could create an “instruction manual” for all exhibitors about best teaching practices. It is important to create

spaces for “interprofessional communication” because different communities may use different communication styles, vocabularies, and discourses (Palmeri, 2004). As an intermediary between the SPSF and its exhibitors, a technical communicator provides the necessary, shared language to achieve the common goal of effective science communication through desired SPSF science standards.

Ambience: Program Committee and Exhibitor Placement

The Program Committee believed that the “exhibitors will bring the visitors,” so they chose exhibitors whose activities were flashy and exciting—touch tanks, birds of prey, and exploding volcanoes—because they could attract more people. According to Dornberger & Venturelli, their goal was to generate volume and excitement because most people think science is boring, but if they put the “fun” in science, more people would be interested in it. They noted that we need this interest because the more the political and educational systems change, the more important it is to stress science because science education is one of the first subjects to get cut from funding. They went on to explain how standardized tests in schools included standards for math, English, and cognitive reasoning, but not science, so the more they could spread science throughout the community and make it relatable, the better. In short, the Program Committee accommodates mostly for visitors. Yet, exhibitor interviews revealed that some were not having their needs met. For example, Greco wanted to be outside to reach more of an audience². Cuffaro would have preferred *not* to be near food vendors because smoke made it

² Co-Chair Rutherford believed a particular exhibitor—Greco’s electron microscopy lab—could have been placed outside because the exhibit’s posters did not qualify as something that *needed* to be protected inside like, say, robotic prosthetic equipment. Rutherford suggested the exhibitor could choose two to three of his best posters, make them life-size, and somehow anchor them to the ground so visitors might be able to walk through them. Greco himself, on the other hand, decided to host his exhibit inside because rain or windy weather outside could ruin his posters (Greco). Since he participated in all years of the SPSF, however, he noticed increasing attendance because he could see all the people he was missing through the window! He said he’d love to be outside if only he could devise a way to anchor and protect his posters, and that it would be more convenient if the SPSF proposed a solution for him before summer because he taught during fall and spring. This example goes to show that both Rutherford

difficult to deliver his message. The Girl Scouts, in reality, have no affiliations with the Boy Scouts and would not coordinate with them for future public outreach festivals because “they don’t have as much invested—in terms of management and volunteers—like we do” (Benefiel & McCallister). These examples highlight that, while the Program Committee chose exhibitors based on excitement and interest levels, they may have overlooked the effects of ambience on exhibitors and how this affected their performance. However, if exhibitors really do bring the visitors, then their needs should be met so that they can perform well.

Brochure UXD: A Participatory Design Approach

Looking at the SPSF brochures, it is evident that some design iterations privilege some populations over others. Kimball (2006) suggests we analyze from whose cultural viewpoint we construct maps (377). Taking Kimball’s suggestion into consideration, the SPSF would need to be more inclusive and relinquish power to the other when categorizing or grouping pieces of information together on brochures (Olson, 2001, pp. 659). The “other” here are the visitors themselves. One way to do this would be to include visitors early in the decision making process of brochure design by asking them directly how *they* want to navigate the festival. This strategy would promote what Simmons & Zoetewey (2012) call “productive usability” based on “citizen-initiated change,” a consideration the SPSF might find valuable when it comes to meeting their mission goals of increased STEAM participation. By embracing this human-centered design approach (Rose, 2016; Walton, 2016), the brochures could better meet the linguistic, cultural, and social needs of the visitors who use them (Agboka, 2013).

and Greco wanted the same thing, but with limited communication, the exhibit has not moved. The work of a technical communicator as symbolic-analyst could remedy this instance and others like it by moving between stakeholders and addressing the concerns of each in a productive way.

AUDIENCE AWARENESS THROUGH EFFECTIVE COMMUNICATION

It is important to know and understand the needs of exhibitors through communication because exhibitors play a large part in shaping the science that is performed at the SPSF. With better audience awareness, the SPSF stands a better chance at providing a space where the public can come to learn about and participate in the science happening all around them. Two ways to achieve this are through interdisciplinary collaboration efforts and effective means of communication with exhibitors throughout the pre/during/post stages of the festival.

Value of Multiple Voices

Interdisciplinary collaboration efforts can afford the festival multiple viewpoints on what it is they are trying to achieve. The festival already partakes in some of these efforts, for example, with the USFSP College of Business to make the evaluation reports and with the School Day Subcommittee to help exhibitors write science standards. However, Dornberger & Venturelli said they never thought of the agenda they were pushing when choosing and placing exhibitors. To avoid the pitfalls of localization (Agboka, 2013), I argue that more interdisciplinary crossover could illuminate how their own thoughts, actions, ontologies, and epistemologies govern the ways they do their work, the ways they do science, and the ways they communicate with others. The festival can achieve this by including representatives from different stakeholder positions at Steering Committee meetings, including city representatives, representatives from different colleges at USFSP, exhibitor representatives, and volunteer voices. Evaluation reports may not be able to capture all of these viewpoints in an open setting, therefore, including these voices at meetings could help communicate each other's goals in order to better reach them and understand for what purpose they are trying to reach them.

Effective Communication

Better communication does not always mean more communication. For example, Benefiel and McCallister explained that, in the days leading up to the festival, they received multiple emails from the SPSF which they then had to forward to four to five different staff members who handled the various kinds of information in those emails (e.g. parking, logistics, activities, Sneak Peek School Day). On the other hand, the 2015 Evaluation Report noted that the USF CMS did not receive the request for exhibitors and almost missed the event. Perhaps the slew of emails Benefiel and McCallister received was an overcompensation³ for this fact, but the SPSF might consider ways to communicate that are the most effective, not the most frequent. For example, the online registration form could be revised to capture necessary information for both the SPSF and exhibitors. In other words, the form could ask more in depth about activity type, preferred location, and why, so that Program Committee can better understand the goals of each exhibitor. An understanding of these goals might assist the Program Committee with exhibitor placement.

³ I cannot be sure given that the only evaluation report available to me is dated. I take note of the recommendations included on the 2015 report, but it offers a limited view of what may have been discussed in person amongst SPSF staff. For this reason, I supplement my discussion with other analysis from maps and interviews.

FURTHER RESEARCH

This study highlights four main factors impacting the spatial performance of science at the SPSF. But what other factors have been left out? Other factors I have excluded, due to limited time and resources, also made a difference in the ways in which science was communicated. Therefore, it is important for other researchers to continue this research by identifying more apparent and unapparent factors to gain a fuller sense of what's happening at the SPSF so they can intervene at times when communication breaks down, is left out, or something else. The researcher could start by widening the scope of this study, in that they collect data from more sources, such as the entire SPSF Steering Committee, all the exhibitors, and all years of the evaluation reports. Given that four major factors were extracted from only a portion of these sources, the entire collection could offer additional, perhaps more accurate, factors related to the spatial performance of science.

This study focuses on the ways in which space affects science communication, but there are other factors at play when hosting a science festival. Since most science festivals operate through the work of partners, sponsors, and citizens, a future study could assume many different angles. For example, a collaborative focus might ask what types of partnerships make up the SPSF, and how those partnerships influence the types of science seen at the festival. An economic focus might follow the flow of sponsorship dollars which, in part, has been shown to affect how science is displayed at the festival. A focus on the SPSF visitors themselves might analyze their demographics and redesign festival space from the bottom-up, paying attention to the needs of visitors and what types of science they want to see.

The SPSF is one festival in a network of 41 registered science festivals in the Science Festival Alliance (SFA) (“2014 Science Festival Alliance Annual Report”). The SFA provides a space for diverse festivals from across the United States to foster “mutually beneficial relationships and exchanges among festival professionals” (“Membership”). Because the SFA provides a list of diverse festivals, this would be a logical starting point for researchers to conduct cross-science-festival research. Studying other science festivals would help researchers understand whether or not the factors found at the SPSF were local or common across all science festivals. Such an understanding would aid researchers in determining the validity of their recommendations.

CONCLUSION

Science festivals are important venues for community engagement with science. Not only do they have the potential to tap into the local concerns of citizens, but they also play a role in shaping the public's understanding of science. To ensure continued success of science festivals that adequately address the needs of its citizens, they must consider the spatial factors that ultimately affect the way science is communicated.

Through map analysis, qualitative interviews, and textual analysis of evaluation reports, this study examined the dynamic factors affecting the spatial performance of science at the St. Petersburg Science Festival. The factors illuminate important considerations for SPSF organizers, given the festival's potential to shape Florida's public policies and matters of concern. As a specific site for interactions between the public and scientists, the SPSF empowers both stakeholders by involving them in science as a social process. To ensure the continued effectiveness and success of such processes, SPSF organizers should examine factors such as sponsorship, logistics, exhibitor ambience, and brochure usability and design to understand the ways they ultimately affect how science is understood at the festival. To mitigate effects from these apparent and unapparent factors, SPSF stakeholders—including SPSF organizers, exhibitors, and visitors—should be more involved with the festival's design processes. Ways to achieve this would be through the work of effective technical communication and reciprocal awareness of SPSF core audiences.

REFERENCES

- “2014 Science Festival Alliance Annual Report.” *Science Festival Alliance*. Retrieved from <http://sciencefestivals.org/resource/2014-sfa-annual-report/>
- Agboka, G. (2013). “Participatory localization: a social justice approach to navigating unenfranchised/disenfranchised cultural sites.” *Technical Communication Quarterly*, 22(1), 28–49.
- Benefiel, A. & McCallister, M. (2017, January 20). Phone Interview.
- Bowker, G. (2005). *Memory Practices in the Sciences*. Boston, MA: MIT Press.
- Braunsberger, K. & Tiedemann, K. (2015). *Evaluation Report*. St. Petersburg Science Festival.
- Bultitude, K., McDonald, D., & Custead, S. (2011). “The Rise and Rise of Science Festivals: An international review of organised events to celebrate science.” *IJSE(B) 1*(2), 165-188.
- Burrell, T. (2016, December 19). Personal Interview.
- Collier, J. H. (2005). Reclaiming Rhetoric of Science and Technology: Knowing In and About the World. *Technical Communication Quarterly*, 14(3), 295-302.
- Cuffaro, M. (2017, January 19). Personal Interview.
- Derrett, R. (2004). Festivals, events and the destination. In I. Yeoman, M. Robertson, J. Ali-Knight, S. Drummond, & U. McMahon-Beattie (Eds.), *Festivals and events management: An international arts and culture perspective* (pp. 32–50). Boston, MA: Butterworth-Heinemann.
- Dornberger, L. & Venturelli, R. (2016, December 15). Personal Interview.

- Edbauer, J. (2005) "Unframing Models of Public Distribution: From Rhetorical Situation to Rhetorical Ecologies." *Rhetoric Society Quarterly* 35(4), 5-24.
- Foucault, M. (1984). "Space, Knowledge, and Power." *The Foucault Reader*. Ed. Paul Rabinow. New York: Pantheon, 1984. 239-56.
- Fuller, B. (2011). Enabling problem-solving between science and politics in water conflicts: impasses and breakthroughs in the Everglades, Florida, USA. *Hydrological Sciences Journal* 56(4), 576.
- Grabill, J. & Simmons, W. (1998). "Toward a critical rhetoric of risk communication: Producing citizens and the role of technical communicators." *Technical Communication Quarterly*, 7(4), 415-441.
- Graf, W. L. (2013). Water Resources Science, Policy, and Politics for the Florida Everglades. *Annals Of The Association Of American Geographers*, 103(2), 353.
- Greco, T. (2017, January 23). Phone Interview.
- Gross, A. G. (1994). "The Roles of Rhetoric in the Public Understanding of Science." *Public Understanding of Science* 3, 3-23.
- Harwell, M. A. (1997). Ecosystem management of South Florida. *Bioscience* 47, 499-512.
- Kimball, M. (2006). "London through rose-colored graphics: visual rhetoric and information graphic design in Charles Booth's maps of London poverty." *Journal of Technical Writing and Communication* 36(4), 353-381.
- Landry, C. (2006). *The creative city: A toolkit for urban innovators*. London: Earthscan.
- Latour, B. (2004). Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern. *The University of Chicago Press*, 30(2), 225-248.

MacDonald, S. (1998). Exhibitions of power and powers of exhibition: an introduction to the politics of display. In *The Politics of Display: Museums, Science, Culture* (pp. 1-24). London: Routledge.

“Membership.” *Science Festival Alliance*. Retrieved from <http://sciencefestivals.org/about/membership/>

“Mission.” *St. Petersburg Science Festival*. Retrieved from <http://www.stpetescifest.org/?page=mission>

Mol, A. (2002). *The Body Multiple: Ontology in Medical Practice*. Durham: Duke University Press.

Murray, J. (2012). Symbolizing Space: Non-Discursive Composing of the Invisible. In *The New Work of Composing*. Logan, UT: Computers and Composition Digital Press/Utah State University Press. Retrieved from <http://ccdigitalpress.org/nwc>

Olson, H. (2001) “The power to name.” *Signs* 26(3), 639-668.

Palmeri, J. (2004). “When Discourses Collide: A Case Study of Interprofessional Collaborative Writing in a Medically Oriented Law Firm.” *Journal of Business Communication*, 41(1), 37–65.

“Partners & Sponsors.” *St. Petersburg Science Festival*. Retrieved from http://www.stpetescifest.org/?page=partners_sponsors

Pernell, J. (2016, December 6). Personal Interview.

Rajiv, S. (2017, January 20). Phone Interview.

Ravelli, L. J. (2006). *Museum Texts: Communication Frameworks*. London: Routledge.

Rofe, M. W. & Woosnam, C. L. (2016). “Festivals as a vehicle for place promotion: cars, contestation, and the creative city ethos.” *Landscape Research* 41(3), 344-359.

- Rose, E. (2016). "Design as advocacy: using a human-centered approach to investigate the needs of vulnerable populations." *Journal of Technical Writing and Communication*, 46(4), 427–445.
- Rutherford, H. (2016, December 7). Personal Interview.
- Schneider, G. J. (2009). *Science in the Science Museum: Representations of Science for the Public* (Doctoral dissertation). Retrieved from ProQuest. (Accession 3371908).
- Silverstone, R. (1994). The Medium is the Museum: On Objects and Logics in Times and Spaces. In Roger Miles and Lauro Zavala (Eds.), *Towards the Museum of the Future: New European Perspectives* (pp. 161-176). London: Routledge.
- Simmons, W. & Zoetewey, M. (2012). "Productive Usability: Fostering Civic Engagement and Creating More Useful Online Spaces for Public Deliberation." *Technical Communication Quarterly*, 21(3), 251-276.
- Sullivan, P. A. & Porter, J. E. (1993). "Remapping Curricular Geography: Professional Writing in/and English." *Journal of Business and Technical Communication* 7(4), 389-422.
- Walton, R. (2016). "Supporting human dignity and human rights: a call to adopt the first principle of human-centered design." *Journal of Business and Technical Communication*, 46(4), 402–426.
- Welhausen, C. A. (2015). "Power and Authority in Disease Maps: Visualizing Medical Cartography Through Yellow Fever Mapping." *Journal of Business and Technical Communication* 29(3), 257-283.

APPENDICES

APPENDIX A: REPRINT PERMISSIONS—ST.PETERSBURG SCIENCE FESTIVAL

Hi Natalie,

Thanks for your email! Yes, I would be glad to grant permission for you to reprint these images in your thesis. For all of the SPSF images, please attribute them to St. Petersburg Science Festival.

Best wishes,

--

Theresa Burress, MLS
Humanities Librarian
Jane Bancroft Cook Library
New College of Florida
USF Sarasota-Manatee
5800 Bay Shore Rd.
Sarasota, FL 34243

APPENDIX B: 2014 SPSF BROCHURE

Zone 6: MarineQuest The 20th annual open house of the FWC Fish and Wildlife Research Institute

OUTDOOR DISPLAYS

- Alien Invaders: Invasive Plants in Florida
- Alligator Research
- Aquaria
- Crustacean Fisheries
- FIM Offshore
- Fish and Wildlife Health: Necropsy
- Fisheries-Dependent Monitoring
- Florida Keys Fisheries Research
- Florida Panthers
- Florida Youth Conservation Centers Network
- Freshwater Fisheries Research
- FWC Law Enforcement
- Manatee Rescue Boat
- Sharks and Rays
- Stock Enhancement Research
- Touch Tanks
- TrophyCatch

KIDS ZONE

Hands-on crafts and activities for our younger MarineQuest visitors

- Face Painting
- Cyotaku
- Marine Magnets
- Marine Tattoos
- Wildlife Origami

VISITING ORGANIZATIONS

- Canterbury School of Florida
- Clearwater Marine Aquarium
- Defenders of Wildlife
- Egmont Key Alliance
- Florida Department of Environmental Protection (FDEP)
- FDEP Florida Coastal Office
- FDEP Tampa Bay Aquatic Preserves
- Florida Parrot Rescue, Inc.
- Florida Sea Grant, Pinellas County Extension
- Friends of Pinellas Master Naturalist
- Friends of Tampa Bay National Wildlife Refuges, Inc.
- HIPPY/R'Club Child Care Inc.
- Institute for Biomedical Philosophy and Energetic Einsteins
- Mote Marine Laboratory and Aquarium
- Nature's Academy
- Save the Manatee Club
- SPCA Tampa Bay
- St. Petersburg Sail and Power Squadron
- Suncoast Fly Fishers, Inc.
- Suncoast Sierra Club
- Tampa Bay Estuary Program
- Tampa Bay Pilots Association
- Tampa Bay Times
- Tampa Bay Watch
- Tampa Bay Water
- Tampa's Lowry Park Zoo
- The Florida Aquarium
- US Coast Guard Auxiliary 72
- US Fish and Wildlife Service

INDOOR DISPLAYS

Floor 1

- Auditorium Program
- Exploring Seagrass Food Webs
- Maunula's Map Emporium
- Red Tide Information

Floor 2

- Fish Feeding Ecology
- Marine Finfish Biology
- Molluscan Fisheries

Floor 3

- Electron Microscopy
- Marine Mammal Research
- Marine Turtle Research
- Protecting Florida's Native Basses

Floor 4

- Deer Health
- Explore Coral Reefs
- Microbiology
- Seagrass Loss and Recovery

Florida Fish and Wildlife Conservation Commission
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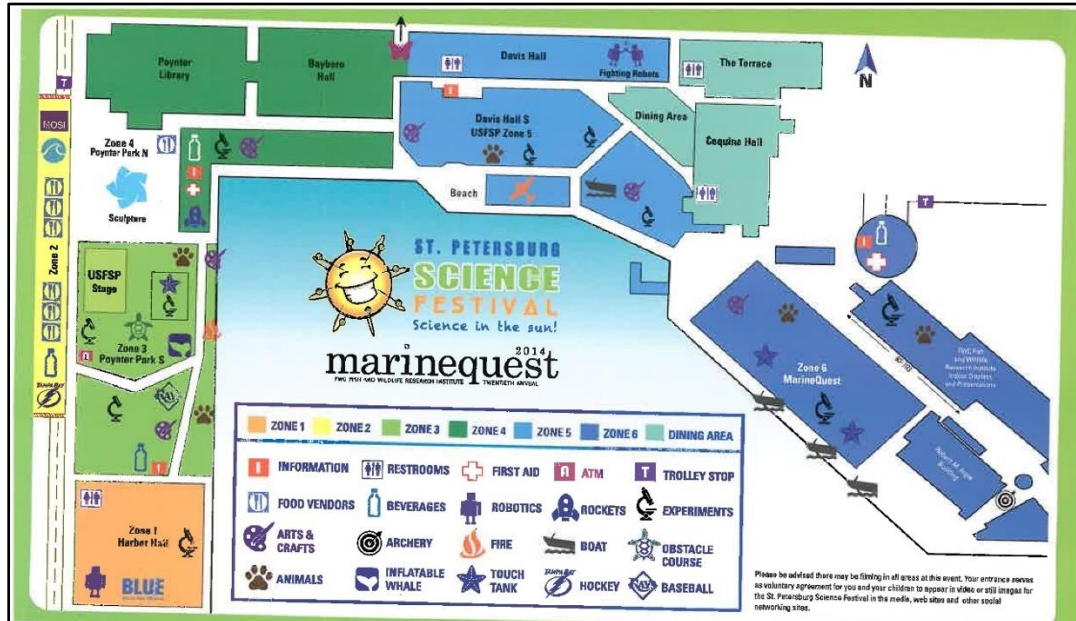
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ST. PETERSBURG SCIENCE FESTIVAL 2014

Science in the sun!



USF St. Petersburg Stage Schedule: Located in Zone 3

10:00 - Opening Announcements	11:30 - Library Puppet Show	1:45 - Funky49
10:15 - VIP Jeopardy	12:00 - Jane Magro	3:00 - DrumQuest
10:30 - Audience Jeopardy	1:00 - MOSI SteamPunks	4:00 - Closing Statements
11:00 - Boyd Hill Birds of Prey	1:20 - Announcements	

For more information: Call (727) 833-9799 x. 206

Zone 1: Sponsored by USF College of Marine Science

ROBOTICS & TECHNOLOGY
FIRST Full STEAM with FIRST!
Eureka! Factory Making the Future
USF College of Marine Science Ocean Technology Group Marine Robot Exploration

FreeFab3D 3D printers
St. Petersburg College Orthotics and Prosthetics HOPE Grant
Coaster Modeling Enthusiasts of Florida K'Nex Roller Coaster
College of Marine Science, University of South Florida The Ocean Microcosm

Clearwater Marine Aquarium
 Clearwater Marine Aquarium: A Working Marine Animal Hospital!
USF CMS-Viruses Lab Viruses!
BLUE Ocean Film Festival Film Screenings

EXHIBITOR INFORMATION

Zone 2: Sponsored by Secrets of the Sea Marine Exploration Center and Aquarium

WaterVentures Florida's Learning Lab/ AV Outreach, LLC
Tampa Bay Lightning Rolling Thunder
Museum of Science & Industry MOSI in Motion

Duke Energy Electric Vehicle
FOOD VENDORS Chick-It-A St. Pete Concessions

Parkshore Grill
400 Beach Seafood & Tap House
El Gallo Grande
Champions BBQ
Wood Fired Pizza

Thank you to our 2014 food donors!

Zone 3: Sponsored by NOAA and USGS

PHYSICS OF SPORTS
All Children's Hospital AllSports Medicine
Tampa Bay Rays The Science of Pitching
MARINE & GEOSCIENCES National Weather Service
NOAA Fisheries Southeast Region NOAA Fisheries and You. Inflatible marine mammals, Turtle Hurdle, Origami animals, and a Touch tank
Shark Angels Fin Free Florida
U. S. Geological Survey Coral Reefs in a Changing Ocean
USGS iCoast - Did the Coast Change? Where Did the Beach Go? Hurricane impacts on our beaches

USF - Fish Ecology Lab Fun With Fish
USF College of Marine Science Education and Outreach Programs Boat Float & Soil, Sand and Sediments Analysis
Museum of Fine Arts Mother Nature MosaPrints
ART + SCIENCE + MORE St. Petersburg Public Library Science At Your Library
Boyd Hill Nature Preserve Birds of Prey presentation
POYNTER PARK SOUTH **Mad Science** **Pathfinder Outdoor Education** FireQuest

City of St Petersburg - Water Resources Dept. Future of Wastewater
City of St Petersburg - Water Resources Dept. Supply and Demand of Potable Water
St. Petersburg Amateur Radio Club Hands on demonstration of world-wide radio communication
Lizard Pavilion World of the Worm: The Genetics of *C. Elegans*
 Fly Me to the Moon: Hovercraft
 It's a Blast! Vortex Canons
 Mirror, Mirror on the Flask
 Imagining and Creating Molecules
 Slime Made Simple
 History in a Bottle
 The Sedimentary Record and the Environment
 Marine Science Touch Tank
 Discovery Academy of Science

Zone 4: Sponsored by Bay News 9

Dali Museum Dalinian Science
National Forensic Science Technology Center CSI Largo
HiCo Marine Laboratory and Aquarium CSI Dolphin Bores
Science Center of Pinellas County Newton in Space

Institute of Florida Studies - Hillsborough Community College Florida Adventure Series and Field Expeditions
Draper Laboratory Working in Space
National Science Teachers Association at USF Hands-On Science
UF/IFAS Extension, Pinellas County Enviroscope: Estuary-Friendly Living

USF College of Marine Science Preventing Marine Debris
BLUE Ocean Film Festival
Southeastern Guide Dogs Puppy Raising
Current Collections Marine Debris Discovery
Whatever Pops

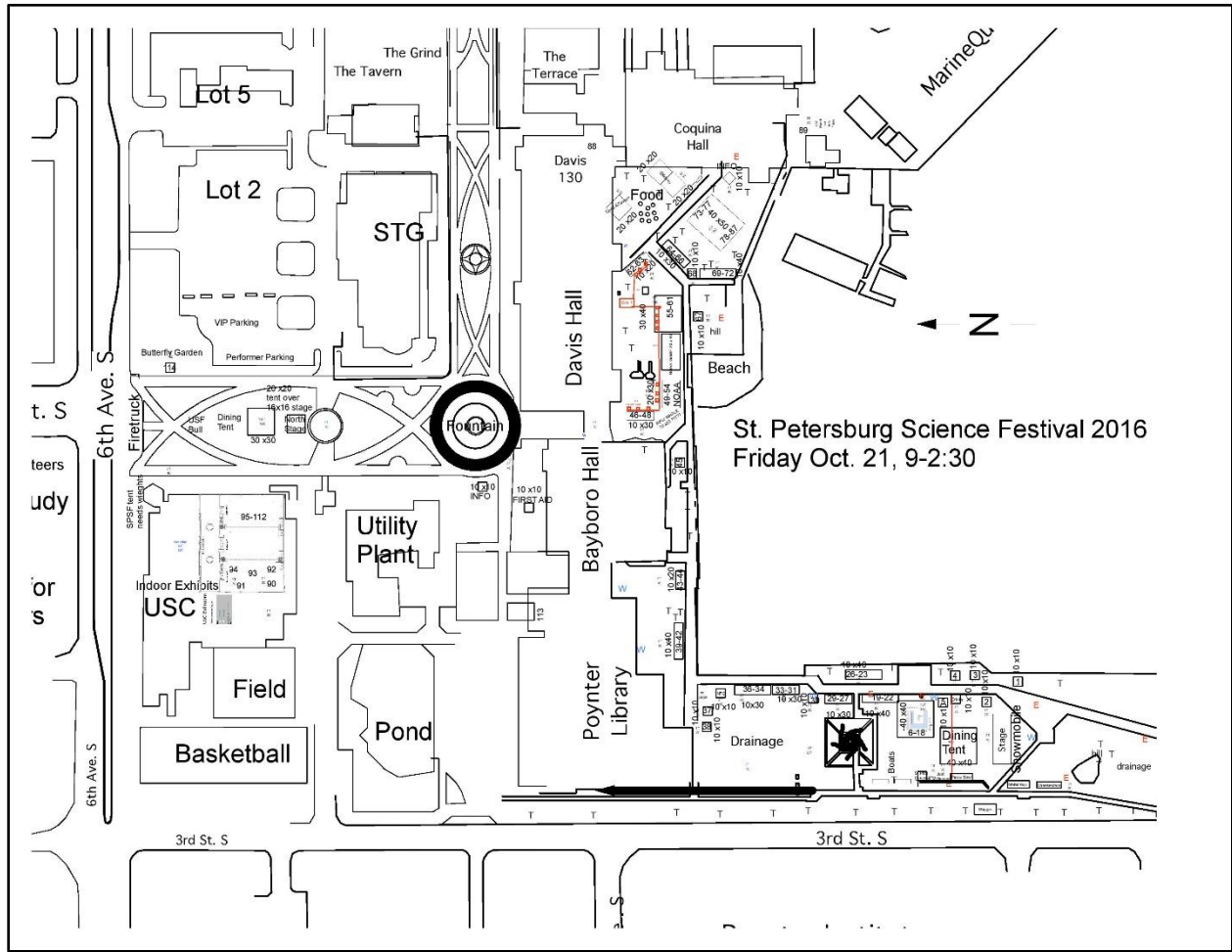
Zone 5: Sponsored by USF St. Petersburg

Bay News 9 Meet a Meteorologist and Forecast the Weather
Douglas L. Jamerson, Jr. Elementary Best Beaks
Florida Aviation Historical Society World's First Airline Brake

Sea to Shore Alliance NESTS conservation survey to win NESTS tees, tote bags, porch flags
Southeast Coastal Ocean Observing Regional Association (SECOORA) Coastal Ocean Observing - Remote Real Time Data

USF ST. PETERSBURG Biology - Life is All Around You!
 Mini Greenhouses
 Water Filtration System
 Photocatalytic Detoxification
 Phaeo Phases Materials

APPENDIX C: 2016 SPSF LOGISTICS MAP



APPENDIX D: INTERVIEW QUESTIONS

Interview Questions

SPSF Co-Chairs

1. Before I begin, can you tell me your general thoughts and opinions about how these maps are organized?
2. Who is involved with organizing the floor plan of the SPSF?
3. How do they decide where exhibitors are placed?
4. What factors influence where an exhibitor is placed? For example, do exhibitors register/pay for a space? Or are they grouped by similar subjects?
5. Why are some exhibitors placed under a single tent while others are placed under a large, shared tent?
6. What determines whether an exhibitor is placed outside or inside?
7. How are exhibitor needs, such as technology and space requirements, requested? How are they met?
8. How has the SPSF's floor plan changed over time?
9. How closely does the SPSF work with MarineQuest in structuring zone 6?
10. Why have the public programs condensed over time?
11. How do you design the public programs? For example, why is zone 6 placed on the back of the public program? How are the colors chosen?
12. Where is the public program for 2011?
13. May I have copies of the logistics maps?

SPSF Program Committee

1. Before I begin, can you tell me your general thoughts and opinions about how these maps are organized?
2. How do you decide where exhibitors are placed?
3. What factors influence where an exhibitor is placed?
4. How has the SPSF's floor plan changed over time?
5. How do you design the public programs? For example, how are the colors chosen?
6. May I have copies of the logistics maps?
7. Do you book exhibitors that have an influence on public policy? What ones? Is this intentional?

MarineQuest

1. Before I begin, can you tell me your general thoughts and opinions about how these maps are organized?
2. Does the FWRI have full control over MarineQuest's floor plan? Or does the SPSF? Or is there a collaborative effort to decide the floor plan?

3. Do you have your own copies of logistics maps? (those that show where each exhibitor is to be placed)
 - a. May I have copies of them?
4. Given that MarineQuest has been hosted for the past 22 years, why did they decide to collaborate with the SPSF?
5. What did the floor plan for MarineQuest look like before its integration with the SPSF? What changes had to be made?
6. What factors influence exhibitor placement at MarineQuest?
7. How does MarineQuest meet the technology/space requirements of its exhibitors?
8. Did MarineQuest have its own public program before being subsumed by the SPSF's public program?
9. Does MarineQuest have a say in the construction of the public programs? For example, how do they feel about zone 6 being placed on the back of the public program? How do they feel about the color choices? How would they do it differently?
10. Do you happen to know the festival logistics/frequency in St. Pete?

Representative from exhibitor

1. How did you hear about the SPSF? Were you contacted?
2. How did you secure a space at the SPSF?
 - a. How far in advance did you have to make this arrangement?
3. How did you request technology?
4. What factors affected the types of activities you could perform?
5. What other festivals or community events do you attend? How does their management differ in terms of securing space?
6. What did you include on the form to be competitive in securing the space you wanted?
7. How long has your organization participated in the SPSF?

APPENDIX E: SPSF SPONSORSHIP LEVELS

		\$25,000	\$10,000	\$5,000	\$2,500	\$1,000
Sponsorship Opportunities		Platinum	Gold	Silver	Krypton	Titanium
General Festival Recognition						
Recognition on event materials		●	●	●	●	●
Recognition and top billing on 2015 Festival materials		●	●	●		
Appointment of Advisory Board Member		●				
Exhibiting Recognition						
Logo placement on sponsor signage displayed at event		●	●	●		
Name recognition on sponsor signage displayed at event					●	●
Logo recognition on event banners and signage		●	●	●		
Customized exhibit space		●	●			
Preferred exhibit space				●	●	●
Print Material Recognition						
Logo on all printed materials to be distributed (ex. programs, bookmarks)		●	●	●		
Name recognition on all materials* to be distributed (ex. programs, bookmarks)					●	●
Logo on Festival T-shirts		●	●	●		
Name recognition on Festival T-shirts					●	●
General Festival Recognition						
Logo recognition on official Festival Homepage and link to sponsor site		●	●	●		
Listing on official event website with logo recognition and link		●	●	●	●	●
Special 'Sponsor in Focus' recognition in one social media post		●	●	●		
Public Relations, Marketing, and Media Recognition						
Recognition through preferred media partners		●	●	●		
Name listing in all press releases and public relations efforts		●	●	●	●	●
Logo recognition and mention on press materials		●	●	●		
Name recognition and mention on press materials					●	●
Exclusive Sponsor Benefits						
Logo banner for main stage (1 available)		●				
Additional Benefits						
Customized benefits to be mutually agreed upon		●	●	●	●	●