

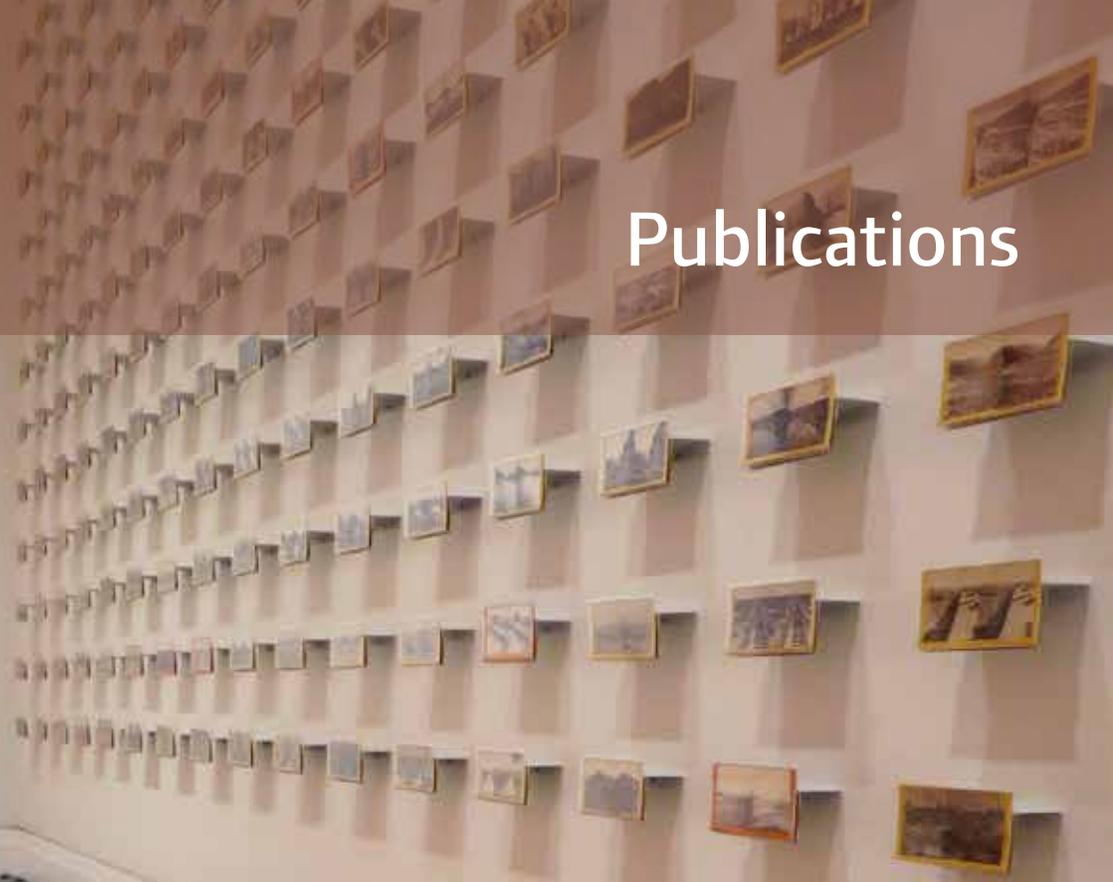
Interstate 80

S

Publications

SSS

SSS
SSS
SSS



3,927,170 tons
estimated amount of ballast
(gravel like this) used
to form the track bed for the
Transcontinental Railroad



Due Diligence

A temporary art exhibition helps preserve rare Chinese calligraphy and serves as a model for sustainable exhibition design and construction.

BY TIM MCNEIL

Treasures through Six Generations: Chinese Painting and Calligraphy from the Weng Collection was a three-month, 3,000-sq.-ft. exhibition at The Huntington Library, Art Collections, and Botanical Gardens. In sync with The Huntington's mission to preserve rare art, the exhibition incorporated a variety of sustainable design features.

TREASURES THROUGH SIX GENERATIONS: CHINESE PAINTING AND CALLIGRAPHY FROM THE WENG COLLECTION

Client The Huntington Library, Art Collections, and Botanical Gardens
Location San Marino, Calif.

Exhibition Design Muniz/McNeil
Design Team Christopher Muniz (principal/lead designer), Tim McNeil (principal/design director) Leon Rodriguez (senior designer), Debi Van Zyl (designer)

Exhibit Fabrication G&G Design Associates

Consultants Associated Mountmaking (hanging and support systems)

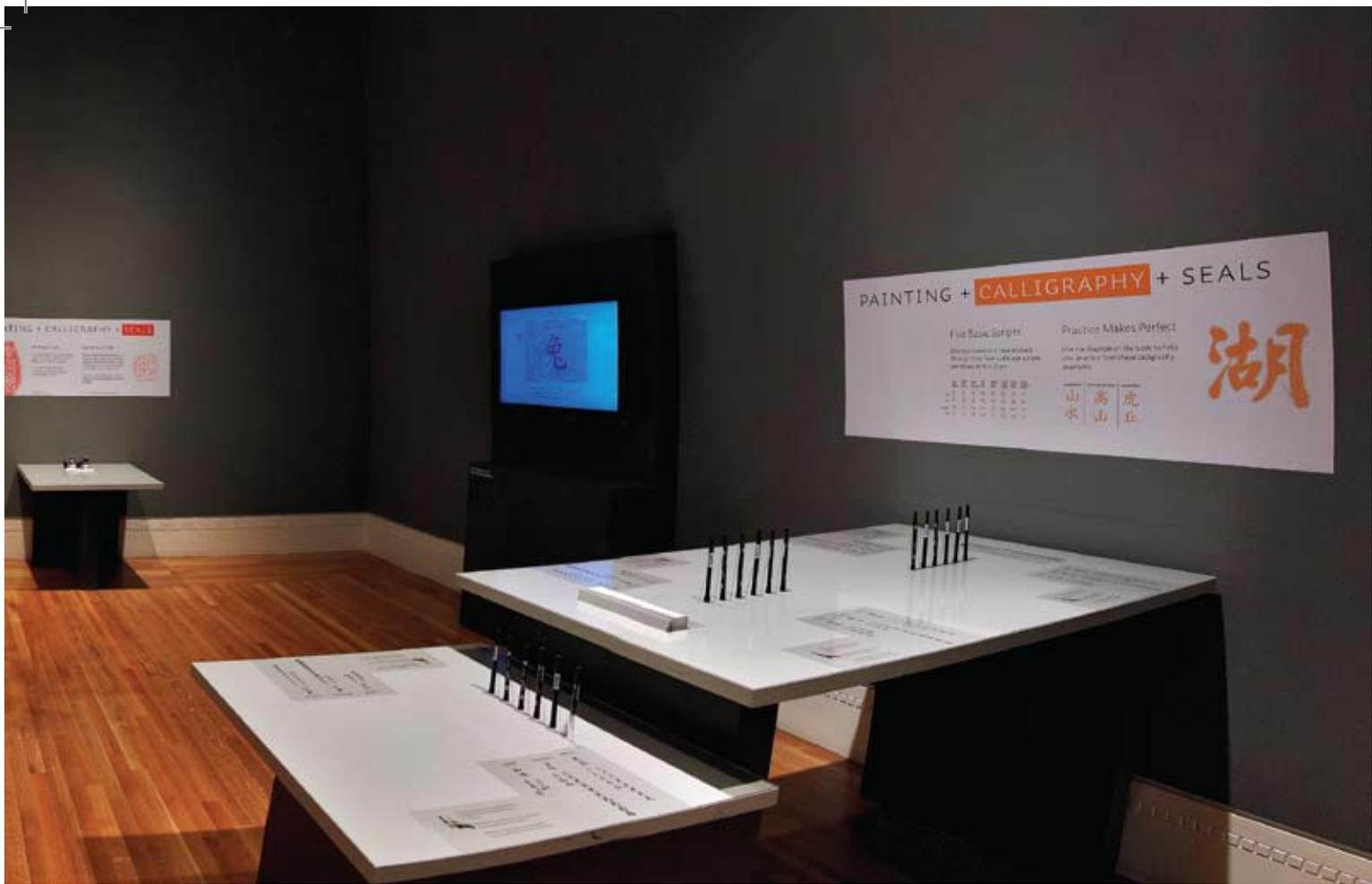
Photos Gerard Vuilleumier

The Huntington Library, Art Collections, and Botanical Gardens in San Marino, Calif., is committed to the preservation of rare books, artworks, and the natural beauty of its botanical gardens for all to enjoy. Hand in hand with this commitment is its connection with sustainability and raising environmental consciousness. So when The Huntington undertook an exhibition focused on the preservation of a collection of Chinese paintings and calligraphy for more than six generations, use of environmentally preferable materials and approaches in the exhibition design was imperative.

Exhibitions are one area where well-considered design and greener practices can make a big difference. Consequently, when we were commissioned to design the exhibition for *Treasures Through Six Generations: Chinese Painting and Calligraphy from the Weng Collection*, our philosophy was to pursue “greener” approaches that would not only reduce impacts to the environment, but would help guarantee the collections’ well-being for future generations.

Building and installing a temporary exhibition uses large amounts of difficult-to-recycle construction materials and products that are potentially harmful to the environment. Maintaining a stable and safe object exhibition environment requires 24-hour-a-day climate control and complex lighting systems that use electricity sourced from burning fossil fuels, one of the chief causes of global warming and unhealthy air quality.

Because of these challenges, exhibitions can serve as a model for green initiatives and more sustainable design practices, including minimizing material use, reducing waste, considering indoor air quality, and maximizing energy efficiency. Along with our fabrication partner, G&G Design Associates, we invested months of research toward achieving those goals.



Waste reduction through modularity

The paintings and calligraphy on view in the 3,000 sq.-ft. exhibition are beautifully crafted, rare, and incredibly sensitive to touch and light. Many of the hanging and hand scrolls are more than 10 ft. long, and a stated goal of the exhibition was to unroll and display as much of the paintings as possible. Using a traditional exhibition design approach, this would require large five-sided protective acrylic vitrines to allow visitors close enough to view the paintings' exquisite details, as well as large pieces of display furniture and partition walls to subdivide the exhibition sections.

Acrylic is a tough, transparent plastic polymer that goes through an energy-intensive and chemically toxic manufacturing process that is considered environmentally harmful. Unlike other plastic products, it is difficult to recycle; however, large continuous sheets can be salvaged and repurposed. To reduce the need for temporary wall construction and minimize the quantity of acrylic used, we designed a modular casework system that created islands of freestanding, table-like furniture.

While museum casework can often be salvaged and re-used for future exhibitions, these cases were in all likelihood too large to be recycled in their entirety. So we focused on making them modular and easy to disassemble, using mechanical fasteners instead of glues and large sheets of acrylic that could be repurposed easily in other projects. Display case bases were made from MDF Lite, a non-toxic, lightweight MDF alternative manufactured by Columbia Forest Products. After the three-month exhibition, the acrylic sheets were unfastened and either reused or put into storage for future exhibitions. Some of the furniture was donated to other museums.

By embracing this “close-the-loop” approach, the majority of the exhibition components could be broken down and re-purposed or removed and reconfigured for future exhibitions—diverting much of the materials that couldn't be recycled away from the landfill. We estimate that our modular approach to the case design reduced materials needed for the exhibition environment by 40%.

Indoor air quality and no-VOC paints

Like most artworks, the Weng Collection paintings are susceptible to changes in temperature and humidity and the presence of chemical substances. Conservation standards require strict monitoring and control mechanisms that include a curing time of several days for all paints and finishes used in proximity to any artworks. While much of that is drying time, it is also off-gassing time, a chance for the chemical agents in the paint to dissipate. Environmental health concerns are linked with the chemicals used in many common paints, and even when dry, these products continue to release toxins that are trapped in an indoor environment—not good for the artworks, and certainly not good for visitors. We specified non-toxic, zero-VOC (volatile organic compound) Dunn Edwards EcoShield paint for the exhibition walls and furniture, creating a healthier environment for both the objects and the visitors.

Graphic panels produced for the exhibit were printed on BIOflex™, a biodegradable alternative to vinyl, with low-solvent and soy inks. Some of the graphics were applied to recycled-aluminum sheeting for rigidity.

Energy efficiency with LEDs

Effectively lighting the calligraphic masterpieces was a critical element of the exhibition design, and also created a huge opportunity for reducing energy consumption. We invested more than six months in researching lighting sources to fit the exhibit's unique needs, including extensive testing and mock-ups to explore color temperature, intensity, and spread of light.

Most electrical power is sourced from non-renewable energies such as coal. Coal power plants are responsible for emitting CO₂, a major factor in air pollution and global warming. Conserving energy is also a smart financial move, since the cost of energy continues to escalate. Exhibition environments are energy hogs due to the constant heating and cooling required to maintain a stable object environment, and the sophisticated incandescent lighting systems that safely and correctly illuminate the artworks.

The Weng Collection paintings demanded a very specific type of lighting that had to be dimmed to 5 foot-candles and controlled to meet conservation standards, as well as satisfy the specific warmer color-rendering properties that make the details on the paintings visible and look their best. Because most of the objects are installed inside of casework, it made sense to localize the light source and illuminate the cases internally rather than from the incandescent halogen ceiling track. This also significantly reduced the glare off the acrylic case front.

The most energy-efficient lighting sources available are LEDs, which use up to 80% less energy and last 15 times longer than incandescent light sources. They also offer tremendous advantages for art exhibition environments. LEDs can be dimmed and controlled for object needs, and produce negligible heat. However, LEDs are still catching up to the intensity and warm color temperature offered by their halogen cousins, the mainstay of most exhibition spaces.

Ultimately, we identified two LED products that fit the bill: for the upright cases, Panoptics Lighting's T5-style tubes (3000K warm white, 60-degree lens, high lumen for longer light throw), and for the long horizontal cases, Elemental LED's continuous flexible LED strip light (warm white, low lumen for short throw).

Once we found the right products, obtaining the quantity we needed meant buying every available unit in the country, simply because the demand is not there yet. We also learned that many LED resellers do not have a complete understanding of what they're importing; the lumens ratings for LEDs (and how to calculate them)

were inconsistent across the industry. And while all the exhibition lighting required dimmers to evenly adjust light and lux levels for fugitive works, control devices were difficult to specify because many distributors did not know exactly which would allow for full-spectrum dimming as opposed to blunt level adjustment.

Traveling the green road

Introducing environmental sustainability into the exhibition design process has become far easier with the availability and decreasing costs of toxin-free, recycled, and renewable products. Efforts have so far focused primarily on introducing alternative options rather than improving what are essentially environmentally flawed products and design practices.

Ultimately, we can make the most impact by questioning and rethinking the design process, reducing energy consumption, and repurposing components and materials. Incorporating a high level of design research and product exploration into fast-tracked and budget-controlled projects is difficult. However, as the specifiers and manufacturers of products that take away from the natural resources around us, aren't we obligated to improve on what has gone before, for the sake of design progress and the environment?

Tim McNeil is a principal of Muniz/McNeil (Los Angeles), associate professor of design at the University of California, Davis, and director of the UC Davis Design Museum. He is chair of the Green Museums Initiative and founder of the Green Museum Accord sponsored by the California Association of Museums (www.greenmuseums.info).





Project

[Treasures Through Six Generations: Chinese Painting and Calligraphy from the Weng Collection Huntington Library, Art Collection and Botanical Gardens San Marino, Calif.](#)

Green Strategy

Strategy Modular casework construction to minimize material use and reduce waste; no-VOC paints to reduce impacts on indoor air quality; energy-efficient LED lighting

Materials

Non-toxic, lightweight MDF Lite, BIOflex landfill-degradable pvc; Panoptics Lighting T5 LED tube lights; Elemental LED Flexible Strip Lights Finishes Zero-VOC Dunn Edwards EcoShield paint; low-solvent and soy inks

Production

Notes Extensive research and testing of energy-efficient LEDs, with emphasis on color temperature and light throw; casework constructed for easy disassembly and repurposing of components

Opposite The same modular casework elements were used for horizontal display cases as well as vertical cases and dividers to create traffic flow. Rather than rely on existing track lighting to illuminate the rare paintings, the design team specified energy-efficient LED T5 tube lighting and continuous light strips to light the works from inside display cases.

Left Above Graphic panels, including the illustrative wallcovering (left) and text panels (center) were printed on BIOflex, a landfill-degradable alternative to vinyl, with low-solvent and soy inks. Some of the graphics were applied to recycled-aluminum sheeting for rigidity.

Left The exhibit includes four Energy Star-rated LCD flat screens that allow visitors to explore the intricacies of the large scrolls and learn about the art of calligraphy. The case shown here displays nearly all of a 50-ft.-long scroll, requiring 3x12-ft. lengths of acrylic.

Adaptation, Mitigation, Innovation: Greening the Exhibition Experience

by Tim McNeil

The Sustainable Revolution

“These are the salad days of sustainability. We are coming to the end of the industrial revolution and entering the beginning of the sustainable revolution” (Werbach, 2008).

When I consider all that has been accomplished in the name of environmentalism over the past decades, I feel encouraged. I can look to the clean air act, the clean water act, progressive green building codes, as well as rapid advances in alternative energy production and fuel technology. Yet, I doubt many of us can truly say that the world is no longer facing an environmental meltdown (literally) due to increased CO2 emissions, the sheer volume of waste, and the harvesting of our natural resources. We’ve come a long way in uprooting the seeds that were sown during the industrial epoch of the nineteenth century. The big question remains “Is it too little, too late?”

Museum and exhibition design standards and practices are beginning to adopt various philosophical approaches to try to address these environmental issues. These range from making the existing design process better (adaptation); to reducing harmful design processes in the first place (mitigation); to rethinking the design process and approaching it from an entirely different perspective (innovation). The following two exhibition projects, the third in progress, will define these strategies further.

Environmental Adaptation: The NRDC Environmental Action Center

In 2000 I was invited to work with the environmental advocacy group the Natural Resources Defense Council (NRDC) on the design development of an environmental action

center and exhibition space. The center now occupies the first floor of their Santa Monica office, a green building that was awarded one of the first platinum LEED (Leadership in Energy and Environmental Design) certifications from the USGBC (U.S. Green Building Council). The renovated structure personifies the latest in state-of-the-art green design and construction. It was a heady time for green building at the beginning of the new millennium, and the project exemplified the growing pains associated with the early days of LEED certification and code compliance. Costs for construction at that time were 30% higher than for a conventional building, and finding a qualified contractor and engineering firm that could navigate the stringent recycling and integrated systems for energy production and water treatment took time. Newer green materials and products were in their infancy and unknown quantities. I recall the frantic re-writing of the local building code to allow for the installation of waterless urinals, and when the newest low VOC (Volatile Organic Compound) paint wouldn’t adhere successfully to the recycled drywall because the two had rarely come into contact and been tested in the field. The NRDC was determined to lead by example. Many greener buildings have followed, but the NRDC building established a benchmark, and was for a period the greenest building in the nation.

The design of the exhibition space did not have to follow the green guidelines employed in the rest of the building. However, a LEED point was awarded for innovation in the design process because of the educational significance of the exhibitions. The opportunity to explore materials, products and alternative design methodologies was extremely appropriate, and one of the first forays into greening the

Tim McNeil is Professor and Design Museum Director, University of California, Davis and Principal, Muniz/McNeil Design, Los Angeles. He may be contacted at tjmcneil@ucdavis.edu.

The big question remains “Is it too little, too late?”

The cost of recycled exhibition materials and green products continues to be greater than their conventional counterparts, although increased demand and competition are now bringing down the price.

(continued from page 29)

exhibition design process.

The center connects visitors to several key environmental issues and the work of NRDC. A retail area and on-line e-activism zone join five informative and interactive exhibitions that range from the threat to our oceans, toxins, global warming and green building. Interpretive signage scattered throughout the center explains the green features of the building, and a ceiling



The sound dome used for this global climate change exhibit at the NRDC Environmental Action Center was one of the many items made from scrap materials from the fabricators shop. Courtesy of Tim Street-Porter.

mounted environmental time line documents the origins of the modern environmental movement to present day. The center was one of the first exhibition spaces to use a touch screen kiosk to tell the green building story. The kiosk accessed real-time building performance data and conveyed this information using easy-to-understand animated graphics. This data captured how much energy was being generated by the photovoltaic array, how natural light was harvested in the office spaces, and how much water was conserved through the grey water filtration system. Comparisons were then made with a conventional building to demonstrate the environmental and long-term cost advantages. (The concept of collecting and presenting building data has since been expanded upon by the Lucid Design Group and others; see <http://buildingdashboard.com/>.) Green product options were limited at the time, yet the exhibition furniture and components excelled for using recycled, non-toxic, and salvaged materials. Examples of these include:

- Agrifiber and formaldehyde free substrates (wheat particle board and green MDF)
- Plastic lumber (recycled soda bottles and saw dust)
- Honey-comb panel board (recycled paper)
- Salvaged wood, metals and plastics
- Aluminum with a high recycled content
- Low toxic paints and stains
- Carpet with a recycled content.

Findings from the NRDC project: relevant ten years later:

1. The cost of recycled exhibition materials and green products continues to be greater than their conventional counterparts, although increased demand and competition are now bringing down the price.
2. Collaborations with other organizations

and individuals who share environmental concerns can help fund museum exhibitions and programming. Patagonia clothing produced a line of products for the NRDC store, Southern California Edison supported the green building kiosk, and actor Leonardo DiCaprio supported the e-activism zone.

3. Green products can be hard to find and have a short shelf life. I don't mean that they won't last long—most perform as well if not better than their conventional counterparts—but often manufacturers will not support a flagging product. Several great products used on the NRDC project are unfortunately no longer on the market. As the specifiers of products we must support growth in this area.

4. It is important to collaborate with an exhibit fabrication team that is willing to explore the process, use their inventory of leftover materials in innovative ways, and test the behavior of recycled materials. Fortunately, the list of qualified exhibit fabricators with experience in building green exhibits is growing.

5. Visitors are interested in environmental issues, want to be informed about the steps taken to green an exhibition or building, and are eager to learn how they can become involved.

6. Design aesthetic and functionality do not have to be compromised when constructing a green exhibition as long as you pay attention to all the details.

7. Energy efficiency has become a dominant factor in the museum and exhibition environment.

8. It's not enough to use recycled materials and specify products that are simply less bad. We need to look at the process by which they are made, what they are made



GreenStop at the UC Davis Design Museum, continued the "green" theme with a ribbon-like highway design made from a biodegradable vinyl. Courtesy of Barbara Molloy.

from, and how they can be designed for longevity and multiple uses (McDonough and Braungart, 2002).

Environmental Mitigation: Eco-Exhibitions at The UC Davis Design Museum

"Sustainability is like teenage sex—everybody says they're doing it but no one really is. And those who are doing it aren't doing it very well" (Makower, 2008).

The Design Museum at the University of California, Davis launched an ambitious 2007-08 series of eco-exhibitions that introduced a range of work by designers at the forefront of sustainable and green design.

Peace Begins Here (September–December, 2007) was based on an inspirational book of artworks by Chen Design Associates entitled *Peace: 100 Ideas*. **GreenStop** (January–March, 2008) exhibited twenty-eight concepts from an international competition to design a self-sustainable and "off the grid" roadside rest stop along Route 99 in Tulare County, CA. **Fashion Conscious** (May–July, 2008) featured the work of twenty-eight designers, and explored sustainability and how it relates to the current clothing market, from the environmental impact of eco-friendly textiles to the re-evaluation of industrial manufacturing.

Better still,
"reduce." Don't
buy it or build
it unless you
have to.



The **GreenStop** exhibition was printed on a biodegradable vinyl using eco-solvent inks. Skeptical that the vinyl would biodegrade, UC Davis fashion students extended its life and made bags from the material to raise funds for their annual fashion show.

(continued from page 31)

Environmental goals for the series of eco-exhibitions were derived from experiences with the NRDC project. However, rather than focusing predominantly on green material use, this venture set out to develop an ongoing strategy for implementing green initiatives and documenting their budget implications. The UC Davis Design Museum serves as a research and teaching laboratory in the university's design program, and the eco-exhibitions were intended to evaluate products and ideas in a formative manner.

The design museum's green initiatives can be summarized in three main categories: reducing waste, green materials and products, and saving energy:

1. Reducing Waste

Exhibition construction can account for up to 70% of a museum's consumption of materials, with typically only 25% of it recycled. The temporary nature of most exhibitions mean a significant amount of raw materials is used for building new walls, display furniture, and exhibit components. Quick turnover and a lack of storage space result in few of these materials being salvaged; the majority are sent to landfill where they can take years to decompose.

Designers are perfectly positioned to enact change and "close-the-loop." Reuse or recycle materials through local non-profit or city run programs. Better still, "reduce." Don't buy it or build it unless you have to. Extend the longevity

of a product, loan it, or give it to another museum. Create a robust, flexible, modular exhibit display system designed to be repurposed and reconfigured multiple times. Use screws and fasteners rather than glues, so that at the end of an exhibition's long life, components can be easily separated, made into something else, or safely recycled. As with many environmental decisions a greater financial investment up front will pay dividends in the long term (similar to investing in photovoltaic panels for your home). Glass may be more expensive, but it is an environmentally better choice than acrylic for protecting objects because it is less toxic to manufacture, recyclable, and longer lasting.

2. Green Materials and Products

Once you've navigated your way through the green washing, there is a growing array of green products applicable for the exhibition environment. Contemporary museum conservation practices honor what environmentalists call the "precautionary principle". That is, to seek out the safest alternatives when making choices ranging from purchasing products to shipping and treating objects. Instead of asking, "how much harm will be allowed?" those who care for collections ask, "How little harm is possible?"

This methodology guided the design museum's selection of materials and products. The eco-exhibitions used alternatives to wood building supplies, such as renewable agricultural by-products made from wheat chaff, and particleboards made from recycled papers. Construction materials including recycled steel, aluminum, and drywall consume large quantities of energy when they are manufactured. Environmental health concerns are linked with the petroleum-based chemicals

Museum artifacts require case interiors that are free from harmful contaminants; shouldn't the visitors who come to see them on display deserve the same?

used in large format inkjet prints, direct application vinyl lettering, cleaners, paints, glues, laminates, carpets and finishes. Even when dry or installed, these products continue to release toxins that are trapped in an indoor environment. Museum artifacts require case interiors that are free from harmful contaminants; shouldn't the visitors who come to see them on display deserve the same? The design museum used non-toxic paints, biodegradable vinyl substrates, eco-fabrics made from recycled soda bottles, natural ingredient cleaning products, 100% post consumer waste papers, and low solvent or vegetable based inks. Many of the specified products used in the design museum can be found at the project wiki site greendesignwiki.com.

3. Saving Energy

Museums are already in the conservation business. Extending this to energy use is a natural fit.

The United States continues to be the world's largest per capita source of carbon dioxide, the chief heat-trapping gas that causes global warming. Encouragingly, investment in alternative energy sources has grown exponentially, and there is a move from supply to managing demand and reducing electrical use. Exhibition environments are twenty-four hour operations that consume large amounts of electricity. Elaborate heating and cooling systems regulate temperature and humidity levels for artifact preservation. Complex lighting systems provide quality color rendering for optimum viewing at a safe intensity for any artifacts that are sensitive to light. An array of newer, more energy

efficient lighting technologies including LEDs (Light Emitting Diodes), CFLs (Compact Fluorescent Lights), and metal halide offer the conservation benefits of less heat, reduced ultraviolet rays, and a longer life. However, the promise of these technologies remains unfulfilled, since the light quality and intensity control does not match that of an incandescent-halogen track system, the mainstay of most exhibition environments (watch this space!).

Climate control within the exhibition environment is an area of intense debate. Some conservators regard the standards developed in the 1970s as excessive and wasteful for today's energy conscious world (Henry, 2007). Not surprising when you consider that a few objects can dictate the climate of a large exhibition space when others require far less stringent controls. Reliable ways to target objects' specific needs are now available with accurate and portable ways to measure humidity levels. This opens up the door to greater localized exhibition climate control and reusable microclimate casework. There is resurgence in green building practices, using natural forms of heating and cooling that eliminate the need for artificial climate control. Ultimately, energy efficient climate and lighting systems coupled with a greater control over localized exhibition areas (dimers, sensors and controls) are the best way to save energy as well as reduce carbon dioxide and consequently cost. The eco-exhibitions succeeded in accomplishing the following:

- Exhibition modularity and furniture reuse

...a few objects can dictate the climate of a large exhibition space when others require far less stringent controls.

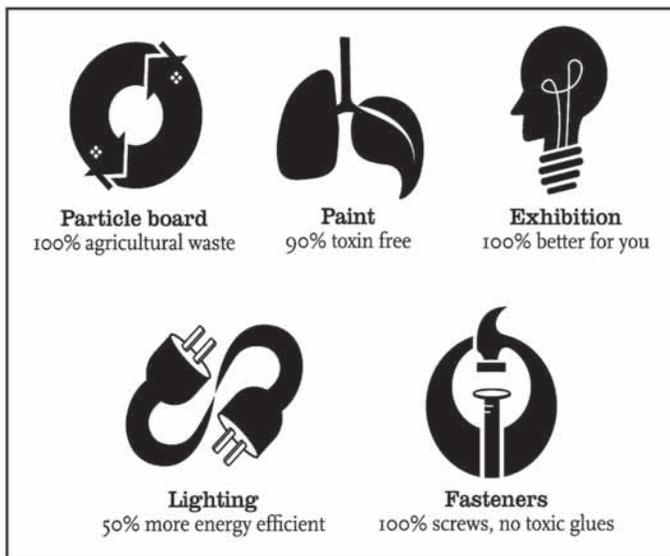
It's clear that our efforts have to focus more on improving currently flawed products and practices...rather than simply using new green products and materials.

(continued from page 33)

- Testing green products and materials
- Printing on recycled or reused materials
- Reducing waste
- Creating a low toxin environment
- Interpreting green initiatives through signage
- Maintaining a high-level design aesthetic and exhibition experience
- Reducing electrical energy consumption
- Cost efficiency and savings
- A project wiki site to capture the research.

downtown EcoCenter. SF Environment is responsible for helping the city of San Francisco reach its very ambitious waste diversion, renewable energy, and climate goals. The redesigned EcoCenter will have educational displays and engaging exhibitions on local, national, and global environmental issues ranging from alternative transportation and energy efficiency, to waste disposal and green building. The center will serve as the mechanism to build collaborations with residents and governmental organizations, and the space will also be used for community meetings, workshops, and environmental film screenings and talks. The EcoCenter is representative of an increase in both corporate and non-profit museum-like visitor centers devoted solely to environmental issues. We are destined to see many more. These projects represent an avalanche of potential work for exhibition professionals in the near future, geared to fostering sustainable behavior and shaping the public's perception of environmental issues and strategies.

The EcoCenter project seeks to explore a new paradigm for designing, fabricating, and operating an exhibition space. At the core of this approach is zero waste and energy neutrality. Many of the green initiatives for the EcoCenter build on the two previous projects I have described, but rather than aiming for low/mitigating solutions it is striving for zero tolerance/innovative solutions. All of the exhibit components will come from salvaged products and materials such as used office furniture and the renovated space. Any new products will be manufactured ethically without producing toxins, subscribe to LCA (Life Cycle Analysis), and be sourced locally to reduce carbon emissions.



Interpretive signage, based on extensive prototyping, informed visitors about the green initiatives at the UC Davis Design Museum.

Environmental Innovation: The San Francisco EcoCenter

“The sustainability brigade are insane to think we can save ourselves by going back to nature; our only chance of survival will come not from less technology, but more” (Lovelock, 2008, p. 2).

The San Francisco Department of Environment is currently undergoing a redesign of its



Dynamic signage (easily updated LED message panels) on the building façade of the San Francisco EcoCenter will convey statistical data about the city's environmental accomplishments.

The building's reliance on renewable energy sources will power lighting, heating, cooling and dynamic LED graphics on the structures facade. Natural light and natural cooling will be maximized, and artificial light minimized, through operable windows and energy efficient lighting sources. The exhibitions will be portable and infinitely flexible so that they can be easily reconfigured, updated and taken on the road to community events. User-friendly, cost-friendly, and eco-friendly, the EcoCenter ultimately strives to embody green aesthetic and functional excellence. These are ambitious goals that require a high level of ingenuity and the environmental infrastructure of San Francisco to implement.

The Sustainable Future

With all this talk—some might say hype—about going green it's easy to get jaded. With a struggling economy and budget concerns, is this really a priority? It's clear that our efforts have to focus more on improving currently flawed products and practices (such as energy intensive lighting and climate control, and non-reusable exhibit components) rather than simply using new green products and materials. Our approach should formalize what many of us do already--that is doing more with less. Of the three sub categories I cited for the UC Davis project, two of them, reducing waste and reducing energy, have a direct correlation with saving money. The third, green materials and products, remains a financial nut to crack. Manufacturing costs for many green products are approximately 15% (based on the eco-

exhibition costs) greater than their conventional cousins—low VOC paints are a good case in point. This will change as the market plays its part and the demand for greener products increases. Indeed, the agrifiber particle boards (wheat board etc.) have all but gone out of business, not so much due to lack of demand, but ironically because the makers of conventional particle boards such as MDF, have switched to FSC (Forest Stewardship Council) certified wood and non-toxic binders in response to the competition. It is also worth noting that the temporary nature of the commercial exhibition industry is reliant on exhibit modularity and reuse. The customer demand for greater customization (unique branding) has in recent years diluted this one-size-fits-all approach. Commercial exhibition professionals are aggressively pursuing green materials and products because they are a visible expression of greening a company's image. For better or worse, this profit driven part of our sector will increase the range and financial viability of greener exhibition products, particularly lighting and graphics.

The strength of our profession has been as deft communicators of environmental issues rather than as practitioners of sustainability, although we are far better than most industries. From an ethical and financial perspective, recycled and renewable materials are important. However, rethinking the design process, reducing energy consumption, and repurposing materials and products will bring us closer to environmental innovation. ☀

References:

- Aitkenhead, D. (2008, March 1). Enjoy life while you can, interview with James Lovelock. *The Guardian*. Retrieved on January 9, 2009 from <http://www.guardian.co.uk/theguardian/2008/mar/01/scienceofclimatechange.climatechange>
- Henry, Michael C. (2007, November 1). What will the cultural record say about us: The stewardship of culture and the mandate for environmental responsibility? From grey areas to green areas: Developing sustainable practices in preservation environments, retrieved on November 16, 2008 from <http://www.ischool.utexas.edu/kilgarlin/gaga/proceedings.html>
- Makower, Joel. (2008, January 19). Opening keynote address. Compostmodern 08, San Francisco. Retrieved on November 16, 2008 from <http://compostmodern.org/2008/speakers.html>
- McDonough and Braungart. (2002). *Cradle-to-Cradle: Remaking the way we make things*. New York: North Point Press.
- Werbach, Adam. (2008, January 19). Closing keynote address. Compostmodern 08, San Francisco. Retrieved on November 16, 2008, from <http://compostmodern.org/2008/speakers.html>



IGNITE!

Museums as Catalysts for Sustainability

Summary Report / March 2012



IGNITE!

Museums as Catalysts
for Sustainability

MAJOR SPONSORS

CAM and GMI would like to thank the following for supporting IGNITE



OTHER SPONSORS

Aquarium of the Pacific
California Academy of Sciences
Exhibit Envoy
San Diego Zoo Global
University of California, Davis

PARTNERS

Sunnylands Center and Gardens
Aquarium of the Pacific
California Academy of Sciences
Gateway Science Museum at California State University, Chico
San Diego Zoo Global and Balboa Park Cultural Partnership
UC Davis Tahoe Environmental Research Center
University of California, Merced Library

EVENT SUMMARY

On Friday, October 14, 2011 IGNITE! Museums as Catalysts for Sustainability was held at seven host institutions across California:

1. Sunnylands Center & Gardens, Rancho Mirage
2. San Diego Zoo Global, San Diego
3. Aquarium of the Pacific, Long Beach
4. University of California, Merced Library, Merced
5. California Academy of Sciences, San Francisco
6. UC Davis Tahoe Environmental Research Center, Incline Village
7. Gateway Science Museum, Chico

Each site convened museum leaders, scientists, environmentalists, community stakeholders, and artists to discuss how to preserve ecosystems and promote healthy communities in their region (see attached list of participants). The day began with a keynote address by environmentalist, entrepreneur, and author Paul Hawken who spoke via simulcast from the Sunnylands Center (an archived version of his presentation is available on the CAM website). Then for the next several hours, each site independently discussed the following questions:

What are the top environmental challenges for our region?

Who is working to address these challenges?

And most importantly, how can museums be involved in the solutions?

After exploring fundamental ecological issues facing each region, each site imagined ways in which museums can be partners in finding solutions to these challenges, and initiate a plan, either formal or informal, to take action. This document summarizes these event outcomes.

Regional Outcomes

At the IGNITE event, each of the seven locations developed outcomes and/or action plans for their region. These outcomes range from a strong commitment to continue the conversations that began at the event to concrete action plans for the development of programming that will promote environmental awareness.

San Diego – A Collaborative Approach

Many participants in San Diego have been working together through the leadership and logistical framework of the Balboa Park Cultural Partnership's Sustainability Program. The IGNITE event gave institutions the opportunity to continue to deepen their relationships and expand their regional message. Outcomes in four overarching areas were outlined: Education, Outreach, Operations, and Finances. Specific actions include highlighting best practices and demonstrations, coordinated messaging, increasing civic partnerships, and collaborating to conserve resources.

Los Angeles/Santa Barbara – An Urban Approach

Participants in the Los Angeles Basin and Santa Barbara area represent the most urban region in the state with a population of 14.7 million or 39% of the state's population, and their discussions focused both regionally and globally. Climate change and water were determined to be the most critical issues and participants recognize that each issue and its solutions impact the other. Two potential projects were suggested: one regional and one statewide. A regional set of programs regarding climate change would use food as an entry point as people relate to their food supply. A larger concept – LA 2015 to 2050 or CA 2015 to 2050 (if other regions participate) – consists of dynamic programs for people to find solutions together, creating an emotional connection to the environment.

Southland Deserts – The Salton Sea Project

The participants at Sunnylands in the Southland Desert region decided to use the Salton Sea to discuss issues of sustainability. The Salton Sea addresses many concerns in the region including, water rights, wildlife management, land use, economics, sustainable energy, population and culture. It also allows them to discuss differing views on what is sustainable. The goal is to present the project in Fall 2013 and may include exhibits, programs, materials, or support for other organizations by providing event space.

Central Valley – The Pacific Flyway Project

Participants in the Central Valley discussed unifying characteristics of the valley and found inspiration in the Pacific Flyway as a way to tell a regional story of wildlife, water use, natural resources, and people. A collaborative project to develop a traveling exhibition, book, and other programming is planned. To show the interconnectedness of our statewide environment, the Salton Sea is part of the Pacific Flyway, so potential links between the Southlands Desert project, as well as other regional projects, and the Central Valley project will be explored.

San Francisco Bay & Monterey Bay Areas – A Continued Dialogue

Participants in the bay regions posed this question: How can we leverage the role of museums as respected and trusted institutions to inspire visitors and community to better understand and integrate sustainability into people's behaviors. While participants committed to continue the dialogue begun during IGNITE, they also developed a "10-Point Sustainability Compact." If pledged, museums would exercise leadership via their onsite operations, policies, and programs to achieve positive outcomes for California and activate stakeholders and generate new replicable models/approaches for critical areas, with specific metrics/targets.

Northern California and the Sierra Nevada – An Education Approach

Participants in northern California focused their attention on the role that formal and informal education plays in connecting people with nature.

With great concern for the impact of Nature Deficit Disorder, the discussion turned to solutions including Place-Based Education and other tangible steps such as streamlining locally available resources so they are more accessible to families and schools, supporting teachers by taking resources to them, and providing incentives to families to get kids out into nature. Participants will continue to explore new ways of enhancing formal and informal education.

Museums as Engaged Partners

The subtitle of IGNITE was deliberately chosen as a call to action—museums as catalysts for sustainability. GMI believes that museums are integral to solving environmental challenges through their involvement in education, conservation, preservation, advocacy, and community building. This happens through exhibits, programs, research, and partnerships, as well as through modeling sustainable practices. Participants in the IGNITE roundtable discussions reinforced this important role of museums, but their discussions underscored the need for museums to internalize and standardize green practices in both programming content and in operations. The following outlines four key factors, as suggested in the IGNITE discussions that are necessary for museums to be engaged partners in regional and global environmental issues.

1. Leadership

California is fortunate to have many examples of museums that are engaged in sustainable operations and active in environmental education, including an increasing number of green museum buildings as designated by the United States Green Building Council's LEED certification program.

Through the Green Museums Initiative, CAM has shown statewide and national leadership by being one of the first and most active professional associations to support a sustainability initiative through its strategic plan, to “green” its conference and internal operations, and to actively promote environmental awareness in all programs and projects. The GMI's Green Museum Accord is the first in the country and calls on museums to pledge their commitment to adopt more sustainable procedures (See Attachment 3 for a list of current signees).

By hosting IGNITE, CAM's GMI literally sparked the building, rekindling, and reinforcing of community connections. The sentiment from event participants was that they did not want the momentum of their conversations to fade after the event. For some regions, a strong network of museums and community partners already exists and was strengthened by the time spent at IGNITE. For other regions, these connections are just beginning. Therefore leadership at a regional level is needed to continue conversations, build relationships, and plan for direct outcomes (i.e. an exhibition or research project). But how is this regional leadership developed and sustained?

2. Time and 3. Resources

Not surprisingly participants cited concerns about not having the time and resources to commit to new projects and initiatives. Some museums may see engagement in sustainability work as just one more challenge for an already stretched staff, budget, and facility.

Participants suggested that there is a great deal of expertise, existing content, technical details, and physical infrastructure in place that can be shared among museums. For example, museums that have developed green exhibit components can share software, hardware, or technical advice so that each museum does not have to start from scratch. Economies of scale can be put to use to benefit multiple sites.

4. Confidence

An underlying tenant in environmental education is to build confidence in people so that they feel informed and encouraged to change their behaviors in a positive way that benefits the environment. Scare tactics, global gloom and doom scenarios, and other negative approaches are not successful in promoting awareness, acceptance, concern, and action about environmental issues. Participants in IGNITE spoke of nature deficit disorder, lack of connection to one's surroundings, and lack of knowledge about what people can do at a personal level. This is true among visitors as well as museum staff. What can be done to promote confidence in museum professionals and their audiences?

Time and resources, leadership and confidence are all factors in the degree to which individual museums and the museum field embrace sustainability. IGNITE is meant to encourage museums to find the time, resources, and community partners to do so. GMI will continue to provide leadership at a statewide level and seek ways to encourage a desire and a confidence to make museums more environmentally sound.

IGNITE!

Museums as Catalysts
for Sustainability



IGNITE!

Museums as Catalysts
for Sustainability

Continued Leadership from GMI

CAM and GMI will continue their leadership roles in advancing museums towards a more sustainable museum community. The following outcomes are planned for 2012:

- GMI will provide quarterly updates on the outcomes of IGNITE in each region
- GMI will continue to determine what resources best meet the needs of museums to encourage sustainable practices and programming
- GMI will continue to host and enhance the GMI website and Online Community
- GMI will give out an annual “green leader award” at the CAM conference to a museum or related organization that is advancing sustainable practices and programming (beginning 2013)

IGNITE The Art of Sustainability – Traveling Exhibition

Artists participating in the regional roundtable discussions will create artworks for a statewide traveling exhibition that will open at the UC Davis Design Museum in June 2012 and travel to museums through 2015.

Attachment 1

ACTIONS YOU CAN TAKE

A sampling of ideas from the event

There were literally hundreds of great ideas generated during IGNITE. The following have been selected for a “short list” of ideas that stand out as unique, positive, and applicable to all types and sizes of museums. Thanks to all of the participants who contributed these suggested actions!

- Ask “what information do visitors acquire in 2 seconds, 2 minutes, 2 hours?” and then program for each scenario.
- Promote the concept of “green pride” that is inclusive, accessible, and affordable.
- Keep up-to-date on current resources and share them with internally and externally. A great place to start is “The Short List: The Most Effective Actions U.S. Households Can Take to Curb Climate Change” by Gerald T. Gardner and Paul C. Stern.
- Be a central clearinghouse of information for the community (from useful tips and resources to how to conduct home energy audits, etc.).
- Engage membership and volunteers: organize inter-museum or neighborhood competitions to save water/energy or recycle; utilize collective buying power with businesses (ex: installation of solar power at home).
- Offer discounted admission for people who walk/bike/take public transit to museum.
- Do programming related to food! This topic is interconnected with so much: local and sustainable farms, healthy eating, culture and tradition, etc. It can also be used as a way to educate about larger issues associated with climate change, water use, and transportation.
- Do programming outside the museum, like an exhibit on sustainable clothing manufacturing at shopping malls or a video about a local sustainable business success story.
- Be aware of upcoming anniversaries: 2014 is the 100th anniversary since John Muir’s death, 2016 celebrates 100 years of the National Park Service, etc.
- Give Community Green Awards to local organizations, businesses, teachers, and elected officials who are taking bold steps towards sustainability. Example: The biggest losers who conserve the most energy or water.
- Ask “what do you value?” Questioning our values as museums, visitors, and communities can open the door to meaningful conversations. Be a place to discuss our current system of values.
- Encourage town halls, community discussions, awareness-building events about local and regional issues. People need and want to be involved in the decision-making process. Remember to offer these opportunities in multiple languages.
- Collaborate, collaborate, collaborate! Other museums, nature centers, parks, libraries, environmental groups, tribal groups, governmental

IGNITE!

Museums as Catalysts
for Sustainability

agencies, utility providers, social service organizations, health care providers, retirement communities, schools, institutes of higher education, businesses, community supported agriculture groups, research scientists, etc. The possibilities are endless!

- Tap into what is going on locally with the new statewide Education and the Environment Initiative.
- Celebrate past/historical conservation success stories. Utilize the resources of local history museums and archives.
- Provide a “menu” of offerings to teachers, but instead of making them come to us, bring it to the teachers at their school sites and make available online.
- Tap into ecotourism, geotourism, and trends such as geocaching and citizen science projects that get people outdoors.
- Focus on the beauty and abundance in your region. Think about fostering transformative experiences.
- Utilize new methods of interpretation: storytelling, place-based education, service learning, lifelong learning, etc.
- Remember that all programming and efforts surrounding sustainability should attempt to overcome the digital divide and literacy divide.
- Create highly visible on-site demonstration projects for sustainability (recycling, composting, energy/water conservation, etc.)
- Target financial institutions and other funders by demonstrating return on investment for sustainability projects.
- Pool, consolidate, and outsource energy-intensive operations to more efficient resources and technology (computer server consolidation, cloud computing, etc.)
- Share resources with other museums (technological, programmatic, expertise, left over exhibit materials, etc.)
- Build sustainability topics into board orientation, staff/docent training, teacher professional development, etc.
- Sign the Green Museums Accord!
- Tell the media!

Attachment 2

THE SPARK

Sent to all attendees prior to the IGNITE event

Fire is a positive force in nature. It clears away debris from the forest floor allowing for new growth and rejuvenation. The intensity of the fire's heat prompts the cones of the Giant Sequoia to open up, releasing seeds into the freshly exposed and fertile topsoil. Plants take root and grow. But when fire is suppressed, these natural cycles are disrupted. Debris builds up and new plants cannot take root. When fire finally does occur, the results can be devastating. Wildfires of this sort are a negative force.

The simple ecological principal at work here inspired the IGNITE roundtables; when ignited under the right conditions fire brings positive change. Thus, the purpose of these meetings is to ignite positive change through discussions, relationship building, and regional projects between museums and their communities. The assumptions behind this project are self-evident:

- California is facing critical environmental challenges
- While there are common issues globally and statewide, there are also region-specific problems
- Focusing on these issues at the local and regional levels inspires buy-in and feels manageable to people
- Collaboration is key to solving these problems
- Museums can and want to play a role in solving these problems

Further inspiration for this project comes from the myriad of people throughout history who have attempted to envision, explain, and understand California through science, art, literature, and spirituality. Their collective realization is that there is no one California and thus there can be no one way to approach the solutions to the environmental, economic, and social problems facing our state.

The environmental historian and author Philip Fradkin offers this summary for our state:

It is a richly textured landscape of great extremes and extreme changes: the highest mountains, the lowest valley, the oldest life-forms, the youngest population, great wealth, grinding poverty, the tallest trees, dwarf forests, abundant water, widespread aridity, startling fecundity, great beauty, and violent death. The landscape is deceptive. Great pleasure and great pain ripple across the surface. This region of moderate climate and gentle, flower-dappled hills can beguile or, alternatively, burst into deadly flames.¹

Through IGNITE we hope to lessen the impact of those deadly flames by fostering natural cycles of ongoing collaboration that muster the power of museums, science, art, and community leadership to solve our most pressing environmental issues. By starting and enhancing existing collaborative efforts at the regional level, we believe a sustainable future for California is possible.

¹ Fradkin, Philip. (1995), *The Seven States of California: A Natural and Human History*. Berkeley: University of California Press.

The Issues

The complexity of California and the ecological issues facing it are political, economic, and social, and are shaped by our geography and our history. In the briefest of terms, California's environmental issues are summarized here. These topics are by no means definitive and of course cross regional, state, and international boundaries. We selected seven regions in the state that are roughly divided by geographical features, but also defined by population centers. While each region faces unique challenges, common issues exist as well, including:

Access to clean water / Water resources – California's immense and controversial system of water delivery includes dozens of dams and reservoirs, hundreds of miles of canals and aqueducts, and thousands of miles of pipes that carry water from places of abundant water (both inside and outside the state) to places that otherwise could not support their populations and development. An ever-increasing population in California will continue to strain this system.

Energy production – Pushed to capacity is an evolving system of energy production in California made up of natural gas, nuclear, hydroelectric, imported and domestic oil and natural gas, as well as increasing renewable sources. As demand increases, new and expanded sources of energy are needed.

A changing climate – Changing patterns of seasons, weather, and temperature; sea level rise; disruptions to migration patterns and other wildlife impacts; and a rise in heat-related illness and diseases will all have adverse effects on California's economy, landscape, and the health and well-being of its residents.

Closure of California State Parks – The eminent closure of 70 of the state's 278 parks may result in a loss of cultural and natural heritage, and will certainly mean the loss of access to public land for recreation. What these closures will mean for preservation, collections management, safety, maintenance, species protection, and public land control and ownership remains to be seen.

Throughout the state, we find ecological issues that impact soil, water, air, flora, fauna, as well as our systems of food production, energy supply, water supply, industry, and development. Animal, vegetable, and mineral are all impacted. But, there are efforts at every point along the way where through leadership, grassroots mobilization, innovation, and technology these problems are being addressed. There is great challenge and great hope. And with museums as participants in these efforts, a sustainable future is all the more attainable.

The following are brief descriptions of the environmental issues facing each region.

Southland Deserts

The southland deserts and Inland Empire are the state's most arid region stretching from the Mojave to the Colorado and the border with Mexico. Ecological issues facing this region include:

- **Water Resources** – Freshwater in this region comes from groundwater, surface water, and water imported from the Delta, the Santa Ana River watershed, and the Colorado River. The reduced amounts of imported water from the Delta and Colorado River raise concerns about the future accessibility of water.
- **Water Quality** – Groundwater and surface water contamination is also an issue. Suspected sources of pollutants are dairy farms, landfill sites, urban runoff, mining operations, and agriculture.
- **Solar Energy Development** – With year-round sunshine, California's desert regions are ideal for the development of solar energy facilities. Yet the construction of solar energy facilities requires large amounts of freshwater and thousands of acres of land, leading to the removal of vegetation, the disruption of soil, and habitat destruction.
- **Urban Development/Sprawl** – Populations in the inland empire are expected to rise substantially in the next few decades. This is an area of high unemployment where people have to commute long distances to find jobs, contributing to traffic congestion and poor air quality. Strains on infrastructure, water supply, and energy production continue.
- **Land Conservation** – The California Desert Protection Act of 2010 protects 1.1 million acres of desert land classifying the land as national monuments and wildlife areas. Additionally, preserves and parks help to protect a region in rapid growth where threatened and endangered species are on the rise.
- **Invasive Species** – Also of threat to habitats are the ever-invading presence of invasive plants and animals.

South Central Coast

The South-Central Coastal area ranges from Santa Barbara to Orange County with a semi-arid climate. Ecological issues facing this region include:

- **Increase in Droughts** – Climate change is changing precipitation patterns. Less rain is expected to fall in the coming years. The Sierra Snowpack, one of Southern California's water supplies, has been shrinking and is melting sooner and faster. In the Sierras, precipitation is falling more as rain than snow and current infrastructure is inundated with early melting water and cannot capture all the water, leading to less water available in the dry summer months. Population growth, especially in arid areas, will increase water consumption and water supplies might not be able to keep up with demand.

- ***Increase in “Fire Weather”*** – Higher temperatures and less water available cause vegetation to dry out and become fuel for wildfires. Each vegetation community requires a different fire regime to stay healthy, but climate change will alter these fire regimes. People now live adjacent to or in forest areas.
- ***Sea Level Rise and Coastal Flooding (Greater Storm Damage)*** – Much of our population lives by the coast, and we have built infrastructure such as water treatment plants along the coastline that are in danger of damage from storms. Higher sea level allows storms to reach farther inland, compounding the impact.
- ***Increase in “Hot Spells” (Heat waves)*** – Over the past century in the Los Angeles area, the number of days over 90 degrees Fahrenheit have increased while the number of days below 45 degrees Fahrenheit have decreased. Heat waves are becoming more frequent and longer-lasting. More hot days and heat waves will lead to an increased risk of heat-related illnesses.
- ***Decrease in potable water from traditional supplies*** – The South-Central coast imports water from the California State Water Project (Delta), Colorado River, Owens Valley, and groundwater. Population is growing rapidly, people are conserving more water, but rain amounts and patterns are changing.
- ***Loss of biodiversity*** – Southern California, specifically the region from South Orange County to the Mexican border, is home to one of the world’s biodiversity hotspots. It’s located in the foothills and terraces.² Many critically endangered species live here along with endemic vegetation, all of which are threatened by climate change and rapid urbanization.
- ***Ocean Acidification*** – With more carbon dioxide in the atmosphere, more carbon dioxide enters the ocean through natural carbon cycles. The carbon dioxide then reacts with the water to form carbonic acid, making it difficult for sea creatures to build their calcium carbonate shells. This is expected to impact fisheries, including local shellfish populations.
- ***Increased Air Pollution/Ozone*** – The South Coast air basin has some of the worst air quality in the nation due to our climate and geography. Sunlight with warming temperatures will lead to an increase in low-elevation ozone concentration. Greater concentrations of particulate matter will aggravate respiratory problems and could lead to cancer.
- ***Increase in Infectious Diseases*** – Water quality will become a bigger issue in the near future. Groundwater contamination has become such a problem that almost half of the wells in the San Fernando Basin had to be shut down. Contaminants can harbor diseases and increased overdrafting will lead to an increase in contaminant concentration. Additionally, climate change could make the weather better suited for insects like mosquitoes, known carriers of infectious diseases. Southern California already has concerns about the West Nile Virus and if the area becomes more appealing to carriers of the disease, chances of infection could increase.

² Spencer, Wayne D., Michael D. White, and Jerre Ann Stallcup. “On the Global and Regional Ecological Significance of Southern Orange County: Conservation Priorities for a Biodiversity Hotspot On the Global and Regional Ecological Significance of Southern Orange County: Conservation Priorities for a Biodiversity Hotspot Executive Summary.” *Conservation Biology Institute*. Conservation Biology Institute, Oct 2001. Web. 6 Oct 2011.

Central Coast

The defining features in this region are the San Francisco Bay and Delta, the Monterey Bay, Pacific coastline, and the Coast Range to the east. Ecological issues facing this region include:

- ***Wetlands Loss/Restoration*** – Wetlands loss in this region started during the Gold Rush and today, just 5% of the original wetlands remain. Today there is regional goal of safeguarding 100,000 acres of healthy wetlands.
- ***Delta Issues*** – Water exports, pollution, wetlands and river habitats loss, endangered species, and potential levee breaks are all serious concerns along the Delta and through its watershed.
- ***Water Quality*** – Agricultural runoff, urban and storm water runoff, and other pollutants drain into waterways, bays, and the ocean, greatly impacting this biodiversity hotspot.
- ***Dam Removal*** – Dam removal projects in areas along the coastline are aimed at restoring habitats, especially for such economically viable species as salmon but have impacts on agriculture, recreation and other stakeholders.
- ***Food Safety*** – Food safety issues, such as the 2006 E. Coli outbreak traced to Central Coast spinach farms, are a concern in this region and focus national attention on regulations and farm management.
- ***Public Transportation*** – Congestion, car emissions, lack of a comprehensive network of public transportation systems, and road conditions impact the quality of life, as well as contribute to air pollution, noise pollution, and greenhouse gas emissions.
- ***Sea Level Rise*** – The combination of sea level rise and that the highest concentration of Californians living along the coast and low-lying inland areas will result in flooding of low-lying coastal areas if mitigation efforts are not made.

Central Valley

The Central Valley spans from Redding in the North to Bakersfield in the South and is surrounded by the Sierra Nevada Mountains and the Coastal Ranges. Embedded are rivers with headwaters in the Sierra Nevada that eventually empty into the Pacific Ocean. Ecological issues facing this region include:

- ***Air pollution*** – Due to its geography, air pollutants in the Central Valley and the Bay Area remain entrapped between the Sierra and Coastal ranges. Pollution in this region is largely caused by agricultural particulates, pesticide use, and transportation. Regulatory efforts have begun to curtail pollution.
- ***Water Contamination*** – Agricultural runoff and percolation contributes to pollutants found in groundwater in the region and one study suggests that the amount of unsafe amounts of nitrate in San Joaquin Valley tap water is expected to double by 2020. Other contaminants

detected in the water supply include traces of aluminum, copper, lead, dioxin, pesticides, and methylmercury.

- **Water Shortage** – Episodes of drought impact this region's available water sources for agriculture and urban development and contribute. Reduced the availability of freshwater and increased amounts of salinity adversely affect aquatic ecosystems. While once plentiful, groundwater basins have dramatically decreased and in many areas disappeared entirely.
- **Inland Wetlands Conservation** – At one time the Central Valley had over 4 million acres of wetlands, but by 1980 less than 300 thousand acres remained. This loss has dramatically impacted waterfowl populations and migratory birds.
- **Loss of Farmland** – According to the American Farmland Trust, some 1 million acres of the Central Valley's 6.3 million acres of irrigated farmland will be lost to development in the coming century. This loss contributes to multiple economic and social pressures.

Sierra Nevada & Foothills

The defining geological feature in this region is the Sierra Nevada mountain range and its Western and Eastern foothills. The range supports the headwaters of California's major rivers. Ecological issues facing this region include:

- **Invasive/Non-Native Species** – Invasive and non-native species contribute the decline of native species in the Sierra Nevada as they out-compete the native species for space, water, and food resources.
- **Biodiversity/Endangered Species** – The region is a biodiversity hotspot and is home to over 200 rare species, 135 of which are listed as threatened, endangered or sensitive.
- **Air Quality/Pollution** – Air pollution from the San Joaquin Valley and Bay Area, one of the most polluted areas in the United States, adversely impacts the Sierra Nevada. Especially harmful are high levels of nitrogen that alter the composition of plant species and contribute to soil acidification and elevated concentrations of nitrate in soils, streams, and groundwater.
- **Lake Tahoe Quality/Clarity** – Lake Tahoe is one of the clearest lakes in the world, but clarity is impacted by erosion, runoff, and particulates in the air; many of these sources are caused by human activities.
- **Forest Fires** – A long-standing practice of fire suppression has made the region exceptionally vulnerable to extreme wildfires. Forest management practices have changed in recent decades to better manage the role of fire in the ecosystem.
- **Forest Fragmentation** – Logging, roads, and other developments have caused fragmentation of the forest throughout the range. This has adverse impact on wildlife and the overall health of the forest.
- **Logging Impacts** – While an important economic engine, logging operations can degrade natural ecosystem functions, impact wildlife,

increase the likelihood of severe fires, degrade soil quality, increase the likelihood of introduced disease and invasive species, contribute to greenhouse gas emissions, and contribute to loss of significant sources of sequestered carbon.

- *Livestock Grazing* – Another economic engine, livestock grazing can contribute to the degradation of native plant communities and aquatic ecosystems.

Northern California

While not geographically a distinct region, Northern California (for the purposes of this initiative) includes the farthest northern reaches of the state, from the temperate coastal habitats, to the upper edge of the Great Central Valley, to the dryer plateau and mountainous regions to the east.

- *Sustainable Farming* – Agriculture is a critical economic driver in Northern California and many organizations are involved in development and practices of sustainable farming that can be used to model good practices throughout the region.
- *Forest Conservation* – Preserving remaining old-growth forests through conservation easements and community forests as well as sustainable timber management is replacing the long-standing battle between the logging industry and environmentalists and local Native tribal groups.
- *Marijuana Growing* – The Emerald Triangle, which consists of Humboldt, Trinity, and Mendocino Counties have cultivated marijuana in homes, backyards, and public lands since the 1960s, and it has contributed to local economies. But environmental impacts include habitat destruction, the killing wildlife, use of illegal pesticides, water, diesel, and high-energy demands for indoor growers.
- *Dam Removal* – Dam removal projects along the Klamath River are aimed at restoring habitats, especially for such economically viable species as salmon. Dam removal is also a remedy for poor water quality upstream as decades of sediment has built up in reservoirs.
- *Habitat Fragmentation* – Development (urban, agricultural, industrial) has fragments wild areas, impacting plant and animals habitats.
- *Urban Development/Sprawl* – Increasing population impacts air quality, loss of agricultural land, increased vehicle emissions, and increased pressures on infrastructure. Additional pressure on economic development can make sustainable practices even more important but a lower economic priority with increased services to provide. Sprawl is especially problematic in Northern California where the perception of unlimited space availability increases the fragmentation of natural spaces, the complexity of public transportation and services.

About the Green Museums Initiative (GMI)

The purpose of GMI is to inspire California Museums to develop green business practices, eco-friendly facility management and sustainable programming. GMI is embarking on this new initiative to look outwardly at what is happening locally and regionally to solve environmental challenges and support the civic engagement of museums with the needs and interests of their communities.

For additional information, see www.greenmuseums.info.

About the California Association of Museums (CAM)

CAM, founded in 1979, is a non-profit service organization formed to represent the interests of California museums. CAM's mission is to "Lead California Museums to the Future" and core programs focus on developing relevant and effective organizations for the benefit of our state's citizens. There are over 1,400 museums in the state of California, with CAM institutional members in almost every county. California's museums are as diverse as the communities in which they are found and include historical societies, cultural centers, art museums, botanical gardens, science centers, tribal museums, zoos, aquariums, and children's museums.

For additional information, see www.calmuseums.org.

Attachment 3

IGNITE PLANNING TEAM

CAM Staff

Celeste DeWald, Executive Director
Sarah Post, Program Coordinator
Helen Trejo, Research Intern
Kirsten Griesmaier, Research Intern
Rebekkah Dworski, Research Intern

GMI Committee

Tim McNeil (Chair), UC Davis Design Museum
Kate Davies, Writer/Curator, GMI Founding Member & Past Chair
Barbara Long, Aquarium of the Pacific
Janice Lyle, Sunnylands Center & Gardens
Adrienne McGraw, Exhibit Envoy
Aaron Pope, California Academy of Sciences

Regional Coordinators

Michealeen Farrington, Sunnylands Center and Gardens
Barbara Long and Kate Davis for the Aquarium of the Pacific
Aaron Pope, California Academy of Sciences
Rachel Teasdale, Gateway Science Museum at California State University, Chico
Rory Ruppert for San Diego Zoo Global
Heather Segale and Leanne Burns, UCD Tahoe Environmental Research Center
Mary Weppeler-Selear, University of California, Merced Library

Designer

Dayee Lueng

Attachment 4

IGNITE PARTICIPANTS

Attendees at the IGNITE event, October 14, 2011

Southland Deserts / Inland Empire - Sunnylands Center and Gardens

MJ Abraham, Director, Riverside Art Museum
Michael Hammond, Executive Director, Agua Caliente Cultural Museum
Stacey Johnson, President/CEO, The Living Desert
Robert McKernan, Director, San Bernardino County Museum
Tyler Stallings, Director, UC Riverside Sweeney Art Gallery
John Worden, Executive Director, Mission Inn Museum
John Benoit, Supervisor, Riverside County Board of Supervisors
Jean Benson, Mayor, City of Palm Desert
G. Dana Hobart, Mayor, Pro Tem, City of Rancho Mirage
Steve Pougnet, Mayor, City of Palm Springs
Cameron Barrows, Assistant Research Ecologist, UC Riverside Center for Conservation Biology
Katie Barrows, Director of Environmental Resources, Coachella Valley Association of Governments
Buford Crites, Board Member, Friends of the Desert Mountains
James Foote, Manager, Santa Rosa & San Jacinto Mountains National Monument
Debra Hughson, Science Advisor, Mojave National Preserve
Sophie Parker, Ecoregional Ecologist, Nature Conservancy
Seth Shteir, Senior Program Coordinator, National Parks Conservation Association
Kurt Leuschner, Associate Professor of Natural Resources, College of the Desert
Alfredo Martinez-Morales, Professor, Southern California Research Initiative for Solar Energy
Celeste DeWald, California Association of Museums – CAM/Green Museums Initiative
Michaeleen Farrington, Sunnylands Center and Desert Gardens
Janice Lyle, Sunnylands Center and Desert Gardens
Sant Khalsa, Artist/Professor of Art, CSU San Bernadino

San Diego Region - San Diego Zoo Global

Alex Diachenko, Volunteer, Balboa Park Cultural Partnership
Alina Talbott, Assistant General Manager, Hines-Petco Park
Alyssa Austin, Project Coordinator, PEAK Student Energy Actions
Andrea Eaton, Maintenance Planning Senior Coordinator, San Diego Unified School District
Betty Peabody, Friends of Balboa Park
Brian Joseph, Executive Director, Chula Vista Nature Center

Christine Yeager, Senior Administrative Assistant, San Diego Zoo
Dave McGrew, Facility Director, Reuben H Fleet Science Center
Deirdre Ballou, Conservation Education Specialist, San Diego Zoo
Elaine Rosenberger, President & Chair, San Diego Regional Sustainability Partnership
Emily Young, Senior Director, Environment Analysis and Strategy, The San Diego Foundation
Harry Watkins, Professor of Marketing, Strategy and Sustainability Fermanian School of Business, Point Loma Nazarene University
Jessica Rinaman, Program Assistant, Balboa Park Cultural Partnership
Jim Stone, Executive Director, Walk San Diego
Jenni Prisk, Facilitator, Prisk Communications
Kelly Makley, Rose Creek Watershed Coordinator, San Diego Earth Works
Ken Barnes, Manager of Buildings and Grounds, San Diego Zoo Safari Park
Kim Stringfellow, Artist/Associate Professor, San Diego State University
Laurie Broedling, LB Organizational Consulting
Marlene Williams, Council Liaison, Girl Scouts San Diego
Michael Castillo, Volunteer, Balboa Park Cultural Partnership
Michael Kelley, President, The Committee of One Hundred
Peter Hamilton, Director of Energy Services, California Center for Sustainable Energy
Robert Gilleskie, United States Marine Corps
Rory Ruppert, Director, Environmental Sustainability, Balboa Park Cultural Partnership
Siobhan Foley, Director of Education and Outreach, California Center for Sustainable Energy
Susan Loveall, Vice President, CFO, and COO, San Diego Natural History Museum
Wendy Spaulding, Director of Education and Guest Experience, Chula Vista Nature Center

LA Basin / Santa Barbara - Aquarium of the Pacific

Kim Abeles, Artist
Rich Block, Chief Executive Officer, Santa Barbara Zoo
Tom Bowman, Author, Bowman Global Change
Paul Bunje, Executive Director, UCLA Center for Climate Change Solutions
Eder, Cetina, Creative Director/Museum Consultant, Olson Visual
Kate Davies, Writer/Curator, GMI Founding Member & Past Chair
Torin Dunnavant, Community Engagement Manager, Tree People
April Economides, Founder and Principal, Green Octopus
Frederick Fisher, Principle Architect, Frederick Fisher & Partners
Nancy Goslee Power, Landscape Architect, Goslee Power & Associates
Phyllis Grifman, Associate Director, USC Sea Grant Program
Juliette Hart, Assistant Professor, USC Sea Grant Program

IGNITE!

Museums as Catalysts
for Sustainability

Becki Hartke, Education Manager, Fullerton Arboretum
Jordan Howard, Student Environmentalist, Rise Above Plastics Student
Speaker Series
Karl Hutterer, Executive Director, Santa Barbara Museum of Natural History
Dean Kubani, Director, Office of Sustainability and Environment, City of
Santa Monica
Barbara Long, Vice President, Govt Relations & Special Projects, Aquarium of
the Pacific
Brenden McEneaney, Green Building Program Advisor, USGBC-LA
Heidrun Mumper-Drumm, Faculty & Director of Sustainability, Art Center
College of Design
Jonathan Parfrey, Executive Director, Climate Resolve Los Angeles
Dora Quach, Administrative Director, Chinese American Museum
Jerry Schubel, President and CEO, Aquarium of the Pacific
Christopher Scoates, Director, University Art Museum, Long Beach
Nancy Steele, Executive Director, Council for Watershed Health
Justin Kalama, Associate, Goslee Power & Associates
Vanda Vitali, Museum Executive, California International Arts Foundation
Karen Wade, Director, Homestead Museum
Jeff Wilson, Vice President, Sustainability Programs, Quiksilver America
Laura Zahn, Program Manager, Climate Registry

Central Valley - University of California, Merced Library

Paola Di Giuseppantonio Di Franco (IGNITE Moderator), UC Merced
World Cultures Graduate Program
Jonathan Bayless, Chief Curator, Yosemite National Park
Diane Cary, Communications Director, UC Davis Arboretum
Nora Cary, Research Development Analyst, UC Merced
Robin DeLugan, Professor, School of Social Sciences, Humanities & Arts,
UC Merced
Emily Griswold, Assistant Director of Horticulture, UC Davis Arboretum
Sarah Lim, Museum Director, Merced County Courthouse Museum
Adrienne McGraw, Executive Director, Exhibit Envoy
Tracy Perkins, PhD Candidate, UC Santa Cruz
Carole Richard, Director of Development SSHA, UC Merced
Ann Savageau, Artist/Associate Professor of Design, UC Davis
Candace Sigmond, Education Coordinator, Grassland Environmental
Education Center
David Stuart, Executive Director/CEO, San Joaquin County Historical Society
Carmen Tang - UC Merced Library, Exhibits Student
Mary Weppler-Selear, Library Services Manager, UC Merced Library

Sierra Nevada / Western & Eastern Foothills - UC Davis Tahoe Environmental Research Center

Alice Cantelow, Environmental Educator, American River Conservancy
Andrea Wilkins, Education and Outreach Assistant, UCD TERC/Parasol AmeriCorps

Betts Markle, Library Director, Sierra Nevada College

Bill Oudegeest, Donner Summit Historical Society

Bob Garrison, Director, Roseville Utility Exploration Center

Carl Young, Acting Interim Director, League to Save Lake Tahoe

Claudia Andersen, CEO, Parasol Tahoe Community Foundation

Heather Segale, Education and Outreach Director, UC Davis Tahoe Environmental Research Center

Jim Markle, Photographer

Judith Lowry, Artist, Nevada City

Katie Merrill, Education and Outreach Assistant, UCD TERC/SNAP AmeriCorps

Leanne Burns, Education and Outreach Assistant, UCD TERC/SNAP AmeriCorps

Linda Desai, Education Director, Placer Nature Center

Marguerite Sprague, Executive Director, North Lake Tahoe Historical Society-Gatekeeper's Museum

Molly Hucklebridge, Environmental Education Specialist, American River Conservancy

Nicole Shaw, Program Coordinator, UC Davis Tahoe Environmental Research Center

Shelley Fallon, Interpretive/Graphic Designer–Business Owner, Fallon Multimedia

Tim McNeil, Director, UC Davis Design Museum

Bay-Delta / Monterey Peninsula - California Academy of Sciences

David Bloom, Facilitator, VertNet Coordinator, Museum of Vertebrate Zoology, UC Berkeley

Megan Gray, Senior Manager of Visitor Engagement, Chabot Space & Science Center

Lisa Eriksen, Founder, Lisa Eriksen Consulting

Joe Brennan, Director of Facilities, San Francisco Museum of Modern Art

Joel Rosenberg, Senior Digital Producer, Lawrence Hall of Science

Katherine Michonski, Program Manager, Business Council on Climate Change

Gil Friend, CEO, Natural Logic Inc.

Bruce Riordan, Climate Consultant, Joint Policy Committee

John Frawley, President and CEO, Aquarium of the Bay

Cyane Dandridge, Executive Director, Strategic Energy Innovations

Jeff Mendelsohn, Founder & Chair, NewLeaf Paper

Dev Crews, CSO, Luminesa

Brenda Altman, Docent, California Academy of Sciences

Shawn Rosenmoss, Senior Environmental Specialist, San Francisco
Department of the Environment
Robert Dawson, Artist/Instructor of Art History, Stanford University
Anna Bar, Naturalist Center Educator, California Academy of Sciences
Mark Valentine, ReFrame It Consulting
Jonathan Katz, CEO, CINNABAR

*Northern California / Redwood Empire - Gateway Science Museum at
California State University, Chico*

Amber Davis, Natural Sciences Educator, Turtle Bay Exploration Park,
Redding
Ann Schwab, Mayor, City of Chico
Cheri Chastain, Sustainability Coordinator, Sierra Nevada Brewing Co.
Chico
Colleen Cecil, Executive Director, Butte County Farm Bureau, Chico
Peter Coombe, Environmental Scientist, Dept Water Resources, Red Bluff
James Pushnik, Director of the Institute for Sustainable Development,
CSU Chico
Jeff Mott, Director, Ecological Reserves, CSU Chico
Jennifer Jewell, Executive Producer, In a North State Garden Radio Show,
KCHO Public Radio
John Merz, President, Sacramento River Preservation Trust
Julia Cronin, Curator of Collections & Exhibits, Turtle Bay Exploration
Park, Redding
Julie Van Sickle, Interim Manager NHM/Co-Director, Redwood Science
Project, HSU Natural History Museum, Arcata
Lexie Smith Kliebe, Project Manager, Exhibit Envoy
Linda MacDonald, Artist
Mary Anne Pella Donnelly, Jr. High School Teacher, Chico Jr. High School
Mary Harper, Education & Program Manager, Turtle Bay Exploration
Park, Redding
Rachel Teasdale, Acting Director, Gateway Science Museum, CSU, Chico
Note taker- Gwen Quail, Gateway Science Museum volunteer/retired
teacher, museum educator

Attachment 5

GREEN MUSEUM ACCORD SIGNED

Current list as of March 2012

Peninsula Art Museum
UC Davis Design Museum
Seymour Marine Discovery Center
Museum of Craft + Design
Aquarium of the Pacific
California Academy of Science
S.C.R.A.P. Gallery
Roseville Utility Exploration Center
Japanese American Museum of San Jose
Santa Barbara Zoo
The Tech Museum of Innovation
Monterey Bay Aquarium
Western Science Center
Autry National Center
Great Harbor Maritime Museum
San Diego Zoo
Maritime Emporium
Gateway Science Museum

THE SCULPTED CITY

In praise of the dimensional map

By Tim McNeil

“A map does not just chart, it unlocks and formulates meaning; it forms bridges between here and there, between disparate ideas that we did not know were previously connected.”

—Reif Larsen, *The Collected Works of T.S. Spivet*

1 The City of Glasgow has many dimensional maps. This one details the area surrounding the cathedral. Combined with the bronze patina, it is beautifully expressive and sculptural.



Like many of you, I love maps. They embody everything dear to the environmental graphic designer: symbolic graphic representation, information hierarchy and organization, the basics of orientation and navigation. Maps have been produced and consulted for thousands of years but only within the past 20 years have they transitioned to a new medium—one that is dynamic rather than static. But advances in digital hand-held devices and GPS navigation

systems have not dented our basic need for dependable and accurate illustrated maps. Case in point: the recent controversy over Apple versus Google maps—inaccuracies in map content meant that towns were misplaced and information was missing on Apple's first version.

All over the world we are reliant on maps—both analog and digital—as an integral component of the wayfinding toolkit. The scope of mapping has advanced exponentially and found new uses as we visualize data, create mind maps, and navigate through computer games.

THE SCULPTED CITY

The anticipated ramping up of augmented reality powered by personal wrist-worn computers that interface with your contact lenses, glasses, or “goggles” will usher in a new era of mapping in which, rather than the user following a printed or screen-based map, virtual cues superimposed in the environment will guide the user.

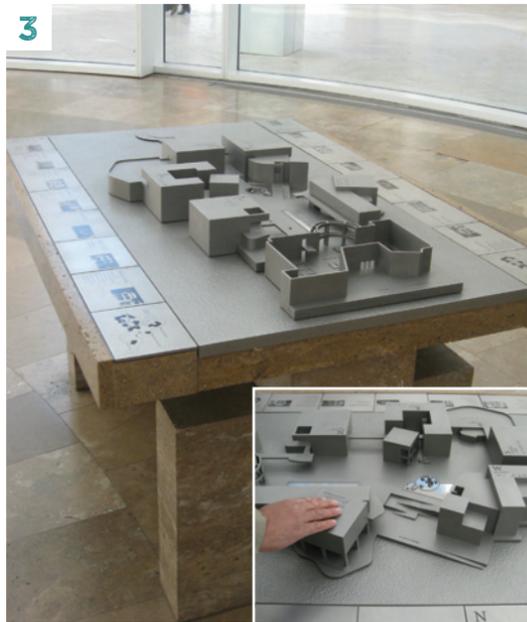
Despite my anticipation and glee at what technology will allow us to do in the future, I want to sing the praises of what could be considered a rather antiquated wayfinding form: the tactile or dimensional tabletop-style map. I’m concerned about the loss of an appreciation for our physical environment and for tangible things that you can touch, smell, and even lick! That’s why I gravitate to dimensional maps—not only are they objects of beauty, but they work!

Part sculpture, part wayfinding tool

Now, besides my obsession with maps, I’m also gaga for outdoor sculpture. I’m drawn to the responsiveness of materials in the landscape, the way sculpture can alter the perception of an environment and at the same time be altered by that environment. This must resonate with many environmental graphic designers—since outdoor sculpture is the ultimate expression of an artistic form intervening as a marker in the landscape.

I consider myself a sculptor of information, striving for effective methods to communicate objects, stories, and messages in the dimensional realm. What I find so compelling about dimensional maps is that they strike a balance between beauty, form, and function, as they are part sculpture and part orientation tool. The dimensional map is informational and inherently sculptural. What’s wonderful about these maps is they become polished and tarnished where people have been touching and caressing their forms the most—creating a legacy of the most popular landmarks and buildings—the equivalent of webpage hits, or Facebook likes.

I’m on a quest to document dimensional maps on my travels, noting their differences and wayfinding failures and successes. The majority of examples are found in Europe, where pedestrian-oriented environments are the norm. Similar to the statues of dignitaries posed on pedestals, placing the map in the town center fosters a sense of civic pride and highlights the city’s main attractions. These maps range in materials from anodized aluminum, Corten steel, stainless steel, and cast bronze (often with a beautiful patina) to cast concrete, carved



2 Elevated on a platform 18 inches from the ground, this map of Edinburgh serves as a congregation point for visitors to the city.

3 Tabletop maps at the Getty Museum provide the opportunity to actively engage visitors in the wayfinding experience. They were fabricated by Carlson Arts LLC of stainless steel pieces, milled and joined like a jigsaw puzzle.

4 Dimensional maps of Milan, Italy, are polished where people have touched them the most, creating a visual legacy of the most popular landmarks and buildings—the tactile equivalent of Facebook likes.

5 Vacuum-formed topographical maps like this one at the Capitol Reef National Park (Utah) visitor center are common in U.S. national parks.

6 The dominant Minster in the City of York in England is the key landmark on this map. The polished (non-patina) parts of the building signify how visitors have used the map for orientation.

7 Combining Braille and interpretive information, this map of Helmsley Castle in England is modeled in exquisite detail.



wood, translucent acrylic, and molded plastic. Some, like rolling maps, purposefully seek to capture neighborhoods, while others tackle larger areas or entire downtown districts and changes in topography.

Dimensional maps accurately model a city through a tactile representation of its thoroughfares, waterways, buildings, landmarks, and other defining characteristics. There’s something about the tactility, the sense of place, and ease of use that even those of us stymied by two-dimensional maps can understand. Aligned geographically with their environment, they represent an incredibly intuitive and user-friendly orientation tool, perhaps the oldest and the most quintessential of wayfinding devices.

Playing dollhouse

My personal journey into this dimensional mapping obsession has three inspirational paths. As a child I would assist my architect father with balsa wood scale models of the housing developments he worked on. Throughout my travels, the vacuum-formed topographic maps found in national and state park visitor centers mesmerized me. And finally, while working at the Getty Museum, I was part of the team that designed a system of dimensional tabletop maps to augment the signage and wayfinding system there.

The Getty table maps are highly successful, allowing people to interact around them. Docents use them to actively engage first-time visitors and invite them to participate in the wayfinding experience. And several other factors make these and other dimensional map experiences particularly user-centric:

- **Meet me at the map** As a natural gathering spot, these maps create an orientation landmark, a focal point for people to gather and collaboratively seek assistance in navigation.
- **3D is just better** Just as we may illustrate buildings or landmarks on a 2D map in perspective or provide an axonometric view for ease of recognition, a dimensional map does that in reality and conveys information quickly and easily, especially for those not as visually literate.
- **Materials matter** Changes in material, texture, and finish can help tell the story. Bronze will patina, blending into and becoming evocative of its landscape. Milled stainless steel is more exacting and clean, representing a crisp delineation of its environment.

“These miniaturized urban landscapes convey a sense of permanence and longevity, like a city captured in time.”

- **Power of touch** Never underestimate the power of tactility, an inherently human disposition and a sense we rarely get to use to feel our way through our surroundings. Dimensional maps also lend themselves to the inclusion of Braille and raised information, and epitomize universal design.
- **Heads-up orientation** Oriented to mirror their surroundings and in the same horizontal plane of sight, dimensional maps are intuitively reflective of what’s around you.
- **Distortion of scale** As with other mapping media, the ability to artificially reduce or exaggerate features can emphasize or downplay different aspects of the environment.
- **Sculptural communication** There is a graphic purity to the seamless integration of physical representational form, with descriptive names and information in one complete unit.
- **Dollhouse effect** Dimensional maps reduce all of us to playing dollhouse with our immediate surroundings. What could be more fun?

Heirloom maps

These miniaturized urban landscapes convey a sense of permanence and longevity, like a city captured in time. And dimensional maps are extremely durable and somewhat vandal resistant.

So what’s the future of this art form? Is the cost associated with fabricating a dimensional map worth it? Is the inability to change information just too arcane? Will the current epidemic of public metal sculpture theft mean cast bronze maps are targets for the smelter?

Likely, we will continue to witness a technology blend wherein physical and virtual mapping are seamlessly integrated. If the predictions are correct, the 3D printing revolution is set to switch product development away from cookie-cutter mass production, returning us to a form of cottage industry. 3D printers will soon be common in the average home, allowing us to create anything from a missing shirt button to dimensional street numbers for our house to, well, dare I say it, a dimensional wayfinding map for our neighborhood. I see a bright future for 3D maps. ■

Tim McNeil is Chair of the Department of Design at the University of California Davis, and a Principal with the design firm Muniz/McNeil in Los Angeles.



8

8 Evocative of the Tower of Babel, this map of the center of Newcastle, England, uses a three-tiered structure to imply the steep topography of the city. Note the columns that don’t exist in reality, but are probably there to reduce the material weight and quantity.



9

9 Following a rain shower, the deliberate absence of weep holes adds to the drama of the River Thames on this map of London.



10

10 Cast in sections of concrete that seem to hover over the pavement, this dimensional map depicts Medieval London and serves as an historical counterpoint to the urban renewal in the Liverpool Street district.

1/2 page ads
Systech
Winsor



A Networked, Experiential, and Expanded Model of Learning Exhibition Design

by Tricia Austin and Tim McNeil

Tricia Austin is PhD Supervisor and Research Leader, Spatial Practices Programme, Central Saint Martins, University of the Arts London. She may be contacted at p.austin@csm.arts.ac.uk.

Tim McNeil is Chair and Professor, Department of Design, University of California, Davis. He may be contacted at tjmcneil@ucdavis.edu.

If you would like to comment on this article or others in this issue, please go to the NAME page on Facebook or send us a tweet @NAMExhibitions.

Exhibition design is often relegated to the fringes of current design education because it defies discipline-based singularity, cutting an anarchic swath through multiple design specialties—from visual communication to architecture, industrial design to theater design—it doesn't fit the traditional model of a disciplinary focused academic design curriculum. Ask any cohort of exhibition designers how many of them have a degree in exhibition design. The answer will likely be less than 10%. Exhibition design is actually a highly democratic, multidimensional and trans-disciplinary design field, and it represents a methodology for 21st century design thinking and practice.

The principles of exhibition design have undergone significant transformation in the last 20 years. The work of the exhibition designer has expanded from shaping space, displaying artifacts, and communicating stories to include exploring and experimenting with active audience participation through novel, experiential, non-museum-like environments.

Recognizing that very few design-centric international forums exist to inform this evolving discipline, the University for the Arts London (UAL) and the University of California Davis (UC Davis) have established a semi-annual summit called Re-envisioning Exhibition Design. The goals are simple:

- Bring together thought leaders, strategists, and practitioners to inform this evolving design discipline, creating an open dialogue between high-level research,

professional practice, and education.

- Examine the term “exhibition design” and evolve a new definition that advances academic understanding and elevates current professional practice.
- Convene participants with divergent views from all sides of the exhibition sphere to create a dynamic forum and future international collaborations and exchanges.
- Assemble an awesome group of people who are doing the most compelling work, in what is the most trans-disciplinary of the design fields.

Loving #Rexd Chaos at the Museum —so many #museumheroes in one room. Twitter (personal communication, April 25, 2015)

The inaugural summit took place in London, April 25-27, 2014 (www.re-XD.org). The first theme, *Chaos at the Museum: Designing for Audience Participation*, examined what's working and what's not in the realm of designing for audience interaction and participation. The event established a networked experiential and expanded model of learning. Invited speakers comprised of influential design practitioners, academics and curators attracted a professional audience of exhibition development teams, academics, PhD and Masters students. Participants converged from Europe, the United States, Asia, South America, and Australia, building a new network across disciplines, countries, and levels of experience. The event took an “expanded” outward facing stance bringing practice,



The PhD Colloquium was the first global forum for exhibition design researchers. All photographs courtesy of Yan Wang.



Elaine Heumann Gurian's keynote summarized the shift in museums from object-centered to public-orientated education spaces.

theory, and education together in a live and sometimes risky mix. The multi-faceted, cross-disciplinary, and participatory format, which progressed from listening and debating, to seeing and experiencing, to hands-on making, concluding in reflection, modeled the process for creative design and “lived” the theme of the summit. It embraced chaos and established the approach for the next summits in the series.

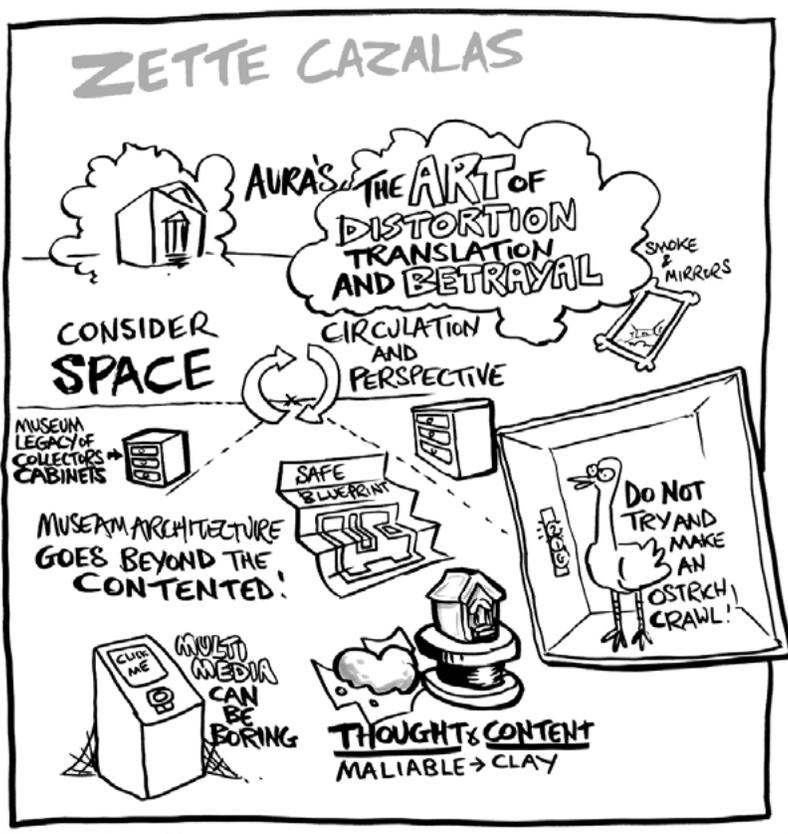
Chaos at the Museum “burned bright”

There was a tangible air of excitement throughout the summit that surprised even the conveners. Chaos at the Museum “burned bright” according to Nick Bell in the *Eye* magazine blog (May 23, 2014). A collision of factors seems to have ignited this energy. Of the 185 people who attended about 60% were practicing exhibition designers and museum professionals who normally encounter each other at project pitches. The current commercial system isolates our most visionary and creative minds, and there are few opportunities for collective exchange. Indeed in Europe, there is no professional body that represents the exhibition design sector. The closest in the U.S. are the Society for Experiential Design (SEGD), and the National Association for Museum Exhibition (NAME).

So, firstly, the summit enabled speakers and delegates to step out of the competitive frame and share an open discursive arena. Secondly, the summit gave Master's and PhD students, about 30% of the attendees, firsthand experience of the internal dynamics of the sector. Students were brought “into the family,” immersed in the debates, and given a voice and an active part to play, enabling them to identify with and internalize the topics and dilemmas. Thirdly, academics and educators, about 10% of the attendees, were able to bridge what can be a gulf between teaching, reflection or research on practice, and practice itself.

The learning was not the dissemination of wise words and formulas drip fed from experts to novices. It was not a top down didactic model. Instead, it was a live, sometimes messy, exchange as constituencies expressed their own perspectives and shared debates. The learners were not only students but also practitioners and the educators. The university setting allowed a frank exchange of views outside the commercial sphere and provided opportunities to form new principles, new alliances, and new collaborations in and across educational and commercial spheres.

Exhibition design is actually a highly democratic, multidimensional and trans-disciplinary design field, and it represents a methodology for 21st century design thinking and practice.



Sketch notes captured the provocative points made by the professional exhibition designers' presentations.

(continued from page 29)

Participants converged from Europe, the United States, Asia, South America, and Australia, building a new network across disciplines, countries, and levels of experience.

Blending Research with Practice

Gurian astutely observed that the “visualisers” need to tell the wordsmiths what they needed in order to have a voice in the industry. (Magidson, April 2014)

The summit took place over a 3-day period and integrated professional exhibition design practice with research and scholarship.

Day 1: PhD Colloquium and Keynote Address

The expanded, networked model of learning was supported by the structure of the summit Day 1, a PhD Colloquium. Initiated by UAL PhD candidate Jona Piehl, the colloquium became what may be the first ever global PhD forum for exhibition design researchers. Papers addressed topics from authorship and co-design to models of spatial narrative, the roles of objects and materiality in exhibitions, and exhibition as speculative

design. Two discussions on audience participation emerged, one questioning how we can “unlearn” our “how to visit” behavior if museums are changing and are about to transform into cultural hubs shaped as much by visitors needs and interests as those of the museum establishment. A second discussion developed from this question: Are we, as educators, funneling our students into designing somewhat formulaic, didactic exhibition experiences? Should we be teaching more critical and experimental forms of practice?

Elaine Heumann Gurian’s keynote summarized the shift of museum culture in the last 60 years from object-centered curated galleries to public-orientated education spaces enabled by digital technologies. She made very eloquent arguments for including the visitor as an active content developer saying, “knowledge sharing is the next big activity of the future.” Heumann Gurian’s discussion of the change from in-house to external design teams revealed the tensions and resentments brought about by the system. Her use of the term “design mercenaries” (to refer to the increased use of design consultants rather than in-house designers) stirred feelings and became a subject of debate throughout the event. Her reflection at the end of the workshops was that design thinking and practice need to be better integrated into the exhibition development process. The question for educators and practitioners is how is this achieved?

Day 2: Professional Presentations and Workshops

The sheer sensory delight of the professional presentations on Day 2

[Heumann Gurian's] use of the term "design mercenaries" (to refer to the increased use of design consultants rather than in-house designers) stirred feelings and became a subject of debate throughout the event.

demonstrated the power of interpretation design to captivate. The enactment of engagement through design kept a sustained focus on design that often gets overlooked at paper driven conferences. The combination of the visual impact and the verbal accounts of interpretive design logic, poetics, and processes revealed a vast palette of design knowledge developed in and through practice. Speakers showed how they use form, scale, materiality, spatial frame, graphics, interactive, and structured events to achieve intellectual, bodily, and emotional engagement. While theoreticians circle round creative interpretation, this area of artistic practice remains elusive yet core to our teaching. We seem to lack the words to describe it, and yet this is the very center of our educational goals.

Following the presentations, a series of creative workshops provided an opportunity for the delegates to participate directly in the analysis and development of the summit theme. Groups of up to 12 people discussed, sketched, mapped, constructed models, and made short films. The workshop themes each addressed a different issue, from the sequencing of the space to the use of unusual spaces outside the museum; the importance of the real; the union of physical and digital design; designing for niche audiences; ethics and strategies for displaying disturbing content; and the politics of the design development process. It was interesting that among our delegates emotional spatial planning was the most popular.

Day 3: Peer-to-Peer Student Presentations
Presentations by students from the

Corcoran College of Art + Design (Washington D.C.), under the leadership of Clare Brown, and UAL students showed how both groups are practicing content-led design and a broad approach to exhibition design education. The Corcoran student presentations demonstrated a range of well-researched topics that consisted mainly of refined propositions for established museum spaces. The UAL students showed projects that sought alternative spaces for



A who's who of international professional design talent including Zette Cazalas (Zen+dCo), Nick Bell (Nick Bell Design), Damian Smith (ISO), Herman Kossmann (Kossmann.dejong), Britta Nagel and Kathrin Millic-Grunwald (Atelier Brückner).

storytelling, physical prototyping, and testing in situ with their target audiences. They presented objects, documentary film, and performance. There was a positive exchange that enabled students and academics to reflect on their respective



Herman Kossmann (Kossmann.dejong) traces Christopher Muñiz (Studio MB) during the lively afternoon workshops.

(continued from page 31)

Speakers showed how they use form, scale, materiality, spatial frame, graphics, interactive, and structured events to achieve intellectual, bodily, and emotional engagement.

curricula and learning environments.

Very interesting looking round the room and observing group dynamics. Communication, power, leadership, teamwork, dysfunction, chaos. #ReXD Twitter (personal communication, April 26, 2014)

Was There Enough Chaos? Summit Theme

Contrary to our expectations about active audience participation, the majority of the designers we featured were concerned more with audience engagement. In other words, designers were seeking to capture the audience's attention and imagination but not necessarily creating opportunities for audiences to actively contribute, curate, or comment on content. Interestingly, student work revealed a higher degree of aspiration for audience participation. This can be interpreted in two ways: either the emphasis on participation becomes muted once designers graduate, transition from education, and enter the work force, or, there is a generational shift that mirrors everyday social media and networking. Either way universities are clearly a breeding ground for new trends and critical debate rather than simply providers of technical skills. Questions remain about forms of participation,

scales of participation and viability of participation. The university design curriculum is a valid place to test and critique definitions, strategies, and assumptions and produce insights that can feed and stimulate the industry.

We heard a lot from designers but we should have had a session with museum curators/interpretation developers/audience advocates to respond to their comments and to get a two-way interaction going. (unpublished post-summit survey)

Design-Centric Forum

The summit demonstrated there is a huge appetite both in academia and industry to share debate and reflection on interpretive design. However, despite a broad marketing effort to all museum professionals for this event there were no senior representatives from national museums, few policy makers, and indeed few impartial museum visitors or non-visitors. The questions about design need to be asked by a wider audience, and indeed students need to get a fuller first hand overview of all the roles and processes in the exhibitions field.

A more theoretical approach. That being said, the fact that practitioners were presenting was extremely interesting. (unpublished post-summit survey)

Expanded Approach

The teaching and learning emphasis at the summit showed how practice and theory can inform each other through expanded experiential learning. Gurian's historical overview provided delegates with a vision of their lineage and confirmed

their group identity as professionals and students working within a specific, albeit contested context. This contributed to a positive atmosphere, and participants ‘learned through doing’ at the workshops—an embodiment of the participatory theme.

This year gave proof that the conference can definitely expand presentations to longer format, workshops to two sessions. So encouraging to see such a critical, enthusiastic mass of work and ideas. (unpublished post-summit survey)

Reflections on Summit Structure

The peer-to-peer student presentations enabled Masters students to network with each other and would have been better scheduled at the beginning of the event. The PhD colloquium created a new constituency of researchers to share methodologies and theoretical frameworks, but attendees were limited to researchers only. At the next summit the colloquium will be open to all. The many presenters and open debate at the summit meant a myriad of themes arose, and the focus occasionally drifted. In future a more explicit frame will be established throughout by emphasizing the key aims, exploring definitions, and providing summaries. The delegates in the audience will be invited on stage to share longer panel discussions.

The summit also inspired a day-long sister event in San Francisco which brought together students and museum professionals in a similar pedagogical setting, and was hosted by John F. Kennedy University Museum Studies Program.



The summit provided invaluable debate and networking opportunities for practitioners, scholars, and students.

Re-XD 2.0 What’s Next?

The next Re-envisioning Exhibition Design summits will be held on different continents, sustaining a design-centric approach and further evolving the networked, experiential, and expanded model of learning. The summits aim to be inclusive, attracting all levels of museum practitioner, PhD researchers, academics, students, and museum visitors.

Audiences, stories, and spaces are core to exhibition design practice, learning, and teaching. Having started with questions about audience participation, we will focus next on designing spatial experiences. The summit will review the transformation of museum spaces from largely ignored fusty collections to go-to city icons, the frictions and syntheses of virtual and physical spaces, and the implications for university design curricula. Stay tuned for future summits on Re-envisioning Exhibition Design: Argentina 2015 and California 2017. See <http://www.re-XD.org> for updates.

A special thank you to Ryo Terui (PhD researcher at UAL) and Emma Thorne Christy (M.F.A candidate at UC Davis) for their assistance in planning and implementing the London summit. ✨

References:

Magidson, M. (2014, April 30). *Why has all the fun gone out of exhibition design?* Design Week. Retrieved June 2014 from <http://www.designweek.co.uk/industry-voice/why-has-all-the-fun-gone-out-of-exhibition-design/3038339>. article

Bell, N. (2014, May 23). *Chaos at the Museum burned bright.* Eye. Retrieved June 2014 from <http://www.eyemagazine.com/blog/post/an-end-to-the-curatocracy>

Having started with questions about audience participation, we will focus next on designing spatial experiences.

sketchbook



Tim McNeil
University of California Davis Department of Design /
UC Davis Design Museum

Spontaneous, rapid, gestural, impressionistic, fluid, preparatory, observational, documentary: these are just some of the words that describe why sketching for me is both a design tool and a form of personal expression.

I typically sketch when I'm travelling. It serves as a memory log of the places I've been. Sketching indirectly influences my design work, enhancing my visual acuity and growing my mental reference library. Sketching allows me to synthesize what I observe and do away with the clutter and superfluous elements. It allows me to be self-selective, alter reality, leave some parts unfinished and draw attention to specific details.

There is a distinction for me between sketches that further a design concept/idea and the ones I render in my sketchbooks. The sketchbook becomes an "object" and the double-page spread creates a tantalizing panoramic format where slices of reality become windows into the past. The sketches and side notes form a collection of short stories. Turning the pages, I can remember exactly where I was sitting and what I was feeling when I made the sketch.

For 20 minutes (my self-imposed timeframe), sketching focuses my attention. I'm oblivious to anything other than what I'm trying to capture. I find it therapeutic and incredibly rewarding—it's an obsession. I read recently that an obsession is something we don't necessarily do well but aspire to do better (Gopnik, 2014). That's how I feel about my sketching. ■

"I've been keeping sketchbooks since I was 16 years old and I have many. They are very important to me and represent a visual record of my lifetime experiences."

These two books were completed when I travelled in India and contain not just sketches but also found objects. I desperately wanted to capture the country's overwhelming color and texture.



As a designer, sketching is my most valuable ideation tool during the design process. I rely on it significantly in the classroom as well to quickly provide feedback and direction to my students.

