

# Bob Miller Light Artist

## Exhibits



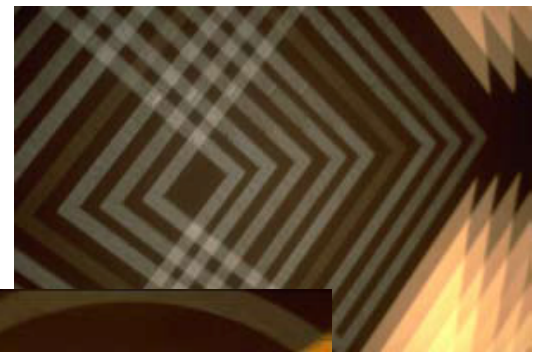
**Sun Painting** is an art piece creating a beautiful display of refracted and reflected sun light. Sunlight is directed to the exhibit with a heliostat, reflected by plane mirrors, dispersed by prisms, and projected onto screens by both plane and non-planar mirrors. The flexible mirrors create a variety of images, with a tremendous amount of delicacy and complexity.

“One of the most thrillingly beautiful things in town.”

—S.F. Chronicle critic Alexander Fried (1972)

“It should be declared a national treasure.”

—Philip Morrison



**Sophisticated Shadows** demonstrates that a white wall is really a mosaic of images, containing much information about the shape and color of the light shining on the wall. Part of this exhibit demonstrates to visitors how a pinhole isolates one of these many overlapping images. Another part of Sophisticated Shadows illustrates different dimensions of shadows using multiple light sources.

“It was a revelation to me.”

—Frank Oppenheimer



**Everyone Is You and Me** lets visitors mix their own reflection with that of another person. By adjusting the light, they can combine themselves, feature by feature, into the person sitting opposite them. The exhibit confuses the eye's way of seeing by using a mirror/window—a half-silvered mirror that reflects as much light as it lets through. The eye can't tell the difference between the visitor's reflection in the mirror and the person behind the window, and so the two appear to fuse into one.

“I am he as you are he as you are me and we are all together.”

—John Lennon quote taped to the exhibit on the day of his death



**Cheshire Cat** illustrates some of the things that can happen when each of our eyes sees a completely different image. At this exhibit, visitors look through a viewer at a friend's face with one eye while the other eye looks at a mirror which reflects a white screen off to the side of the exhibit. By sweeping a hand quickly over the white screen, the eye looking in the mirror sees the motion. Motion is one thing that grabs the brain's visual attention; this distraction causes the viewed friend's face, or parts of it, to momentarily disappear. The eyes and smile will usually be last to disappear.

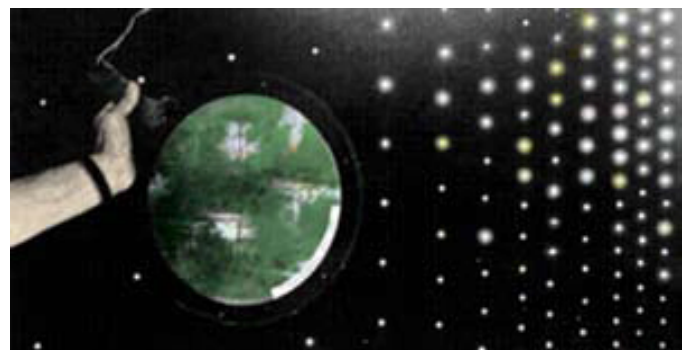
“Not paying attention to something seems to be a very active process.”  
—Perception Journal, Richard Gregory, editor

**Aurora** shows how reflections are created by both the shape of the light and the shape of the reflector. This reflector is a large curved sheet of brushed stainless steel. The ridges in the steel act like tiny mirrors, each reflecting an image. When the images from all the ridges add up, they blend into a single elongated image that looks like a ribbon of light. The many-colored tiles of the exhibit allow visitors to experiment with both the shape and color of the reflections.

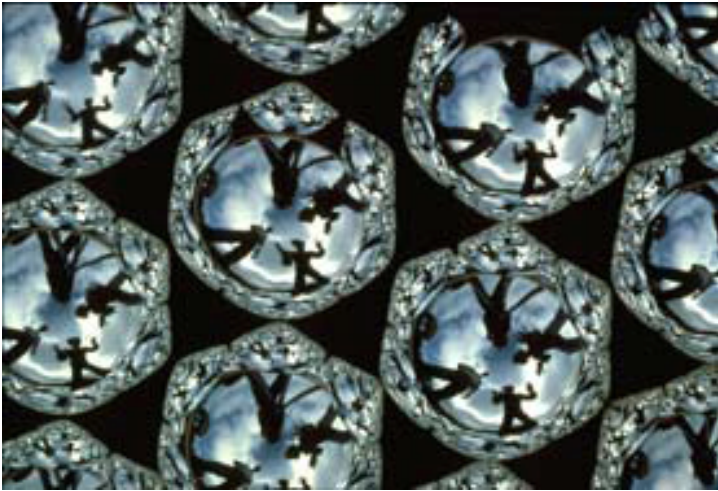


The **Anti-Gravity Mirror** demonstrates how difficult it is to tell a mirror image from a real object. With the mirror's unique configuration, all sorts of impossible tricks appear to be easy: a visitor seems to be able to lift both feet off the ground or make his or her head disappear.

**Holes In A Wall** reveals how pinholes filter images. A perforated metal screen has a few pinholes spaced far apart on the left, and many holes close together on the right. By holding up a translucent screen, visitors can observe how the individual images produced by the pinholes on the left gradually overlap and combine to form a white wall on the right. What is ordinarily thought of as white surface can really be a mosaic of images.







When you point a finger at the exhibit **Christmas Tree Balls**, each silvery ball reflects a slightly different image. No matter where the balls are placed, they will reflect some image, as long as there is light. The dark sections between the balls occur because all the light is reflected back and forth between the balls, and none of it gets to your eye. The exhibit's side panel can be raised to reveal that the balls are in fact round, even though the dark edges make them appear to be crinkled.

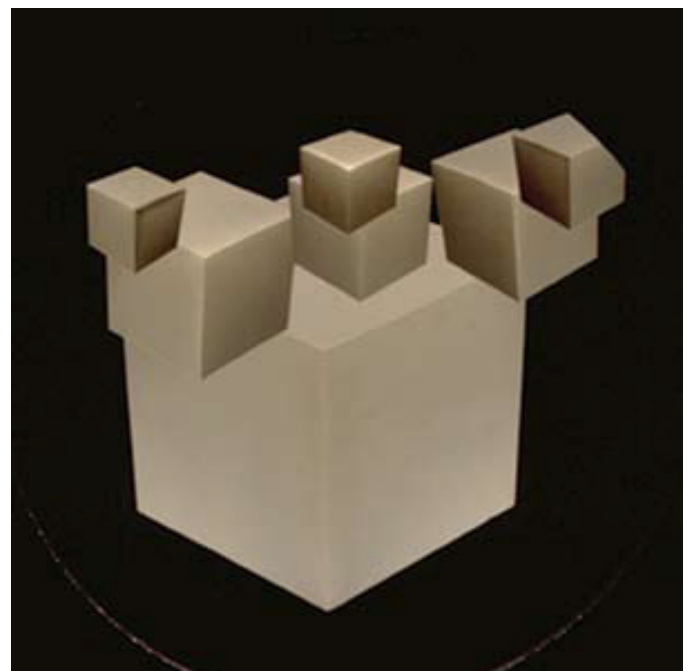
Everyone has experienced eye-hand coordination; **Mirrorly A Window** shows the effects of eye-hand un-coordination. By placing both hands on the exhibit and looking into the mirror from one side, it creates the illusion of two real hands. What is actually seen is simply one hand and its mirror image. Anything visitors try to do with the hand on the other side of the mirror causes a conflict between their sense of vision and sense of touch. Some people find this experience very disorienting.

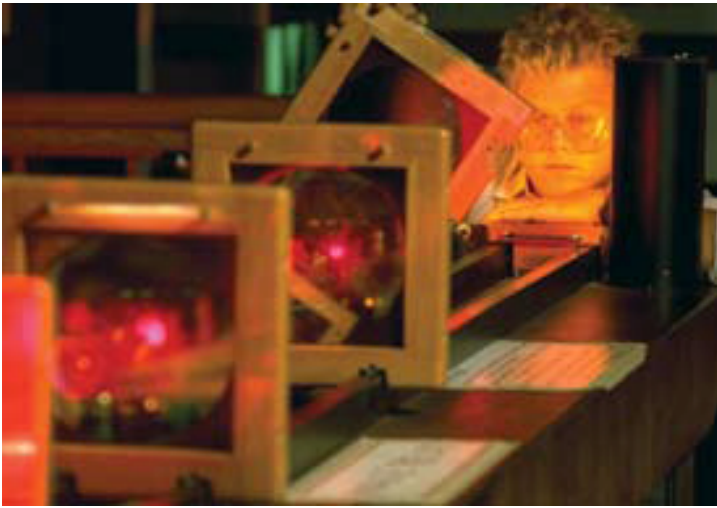


**Prism Tree** By looking through a prism hanging from this metal tree, one is able to look at different light sources and objects. One will notice that fluorescent light has a different spectrum than natural light.



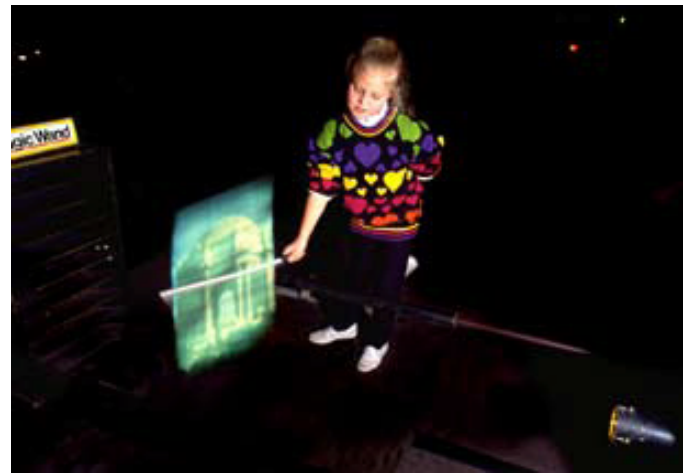
**Far Out Corners** is an extension of an illusion called the *Necker Cube*, an outline which can be interpreted in two equally feasible ways— concave or convex. The actual corners here are concave, but the way they are lit encourages the eye to see them as solid cubes which will seem to turn and follow you as you move in front of the sculpture.





**Image Relay** Four lenses are arranged along an optical bench to provide the visitor with a variety of experiments. Lighted areas at each end with the four lenses spaced two focal lengths apart provide an optical relay that transmits images at one end to the other. The use of a “field” lens can be explored in this arrangement. Each lens may be tilted out of the optical path. A lens near one end can be moved along the bench for focusing images. A screen and a flip up light source on one end which contains red, white and blue lights, enable the visitor to experiment with chromatic aberration. A screen with an annular shaped aperture allows the visitor to experiment with spherical aberration.

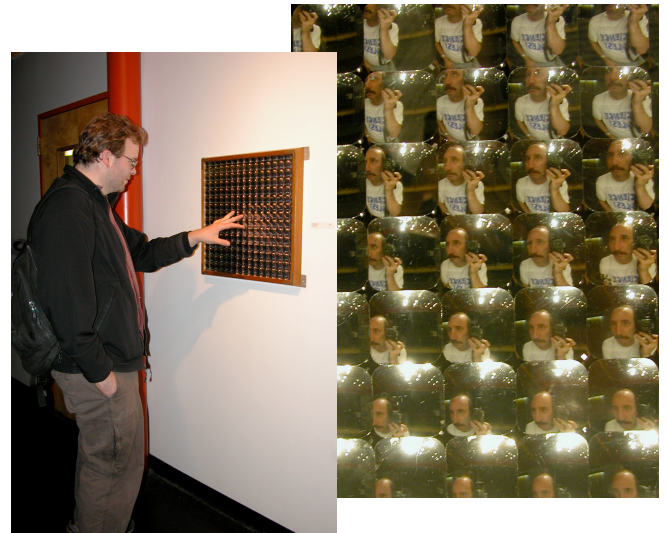
There’s really no magic at work in the **Magic Wand**. A projector produces a real image in space. Waving the wand provides a surface for the image to reflect from, so the light can get into the viewer’s eye. Persistence of vision—the eye’s capacity to retain an image for a short period of time—lets the brain see the moving reflections from the stick as one whole picture. Other images in space can be found by waving the wand closer to or farther away from the projector, but only one image is in focus



Most people don’t think about taking light apart and assembling it again. At **Distilled Light**, white light is broken up with special filters that reflect one color and let through all the rest. A beam of white light becomes three beams of red, green and blue light. Using the same type of filters, the three colors are reassembled into a beam of white light again. If you block one of the seperated beams, say the blue beam, you can see that white light becomes yellow without its blue component. You can also insert a colored filter into the initial white beam and see what colors are let through.



Sometimes, someone’s trash is another’s treasure. When a box of mirrors originally destined to be manufactured into Polaroid’s SX70 cameras showed up on the Exploratorium’s doorstep, Bob made **Image Mosaic** out of them. When you stand in front of the frame of mirrors, you see yourself duplicated dozens of times, but each upside-down image is slightly different because each mirror “sees” you from a slightly different position.







Everybody loves kaleidoscopes. Bob Miller took this to an extreme. At the **Duck-Into-Kaleidoscope**, you do just that - duck under the wall of the exhibit and into the middle of a giant 3-walled mirrored chamber where you can see thousands of "you"!

Many children have had the experience of standing between parallel mirrors and seeing their image multiply reflected off onto infinity. This exhibit, **Look Into Infinity**, makes it easy. A fixed mirror surrounded by lamps has a hanging mirror in front of it with eye-holes for visitors to look through. The visitor can move the hanging mirror and manipulate the infinite "tunnel" they see through the eye-holes.



Ever wonder what you look like from behind? Using 4 giant mirrors, **Tail Yourself** lets you see. The exhibit consists of two pairs of mirrors. Each pair is set at exactly 90 degrees to each other. This arrangement reflects light back exactly in the direction it came. If you look into such a pair of mirrors your reflection is not right-left reversed and you see your face as others see you. With two pairs of these mirrors, you can see what you look like from behind.