

## **Holography Artists' Biography Luminous Windows: Holograms for the 21st Century**

**Written by Seth Riskin  
Manager of the MIT Museum's Emerging Technologies and  
Holography/Spatial Imaging Initiative**

### **Stephen Benton**

Stephen Benton was a central figure in display holography and the pioneer of its digital development. His "rainbow" holography invention linked the holographic image and common, white-light illumination, as well as the worlds of science and art. He was a self-described "optiker" with broad interests in optics and 3-D imaging, as well as image content, which led him to the visual arts. Working at MIT and the Polaroid Corporation with figures such as Harold Edgerton and Edwin Land, Benton surrounded himself with the people and the resources that fostered his own genius. As a scientist, professor and polymath, he bridged the worlds of artistic and technical holography, stimulating growth of the medium in multiple fields. He was a founding professor at the MIT Media Lab, founding Director of its Spatial Imaging Group and Director of the Center for Advanced Visual Studies, MIT's research center for the arts.

The Bartlett Head is one of the first achromatic white-light transmission holograms, a hologram of the "rainbow" technique that overlaps wavelengths to stimulate a white image. It was developed at the Research Laboratories of the Polaroid Corporation for the technique's unveiling in 1978. Likely a representation of Aphrodite, the subject is an ancient Greek sculpture, the centerpiece of the classic collection of the Boston Museum of Fine Arts, that was selected for its visual beauty to show off what Benton described as "The best ever achromatic image."

"Wave photography" is how the late Russian physicist Yuri Denisyuk described his 1962 invention that uses lightwave interference to record three-dimensional images. He developed his technique independent of Dennis Gabor's 'holography', invention of 1947. Denisyuk's thinking and technique were distinct, resulting in the first 3-D images viewed with ordinary white light instead of laser light. White-light reflection holograms became a popular way to display priceless Russian museum treasures in traveling exhibitions. Tea Set is an example and was presented by Denisyuk to MIT Professor Stephen Benton, the inventor of white-light transmission ("rainbow") holography

### **Rudie Berkhout**

## Holography

Procacci

NAEA 2014

The late Rudie Berkhout was an artist who advanced holographic techniques in the development his own artistic language. He was one of the early pioneers with a self-constructed laboratory in New York City in the late 1970s. For the young Berkhout, a fashion designer and lighting designer for the theater, holography represented new territories in visual expression appropriate to his expanding ideas. Berkhout systematically took advantage of the limitations of holography, especially the “rainbow” technique, to define a visual language constructed of light, color and space freed from object-representation. He used pieces of ground glass, lenses and holographic optical elements (a hologram with the function of an optic) to produce layered holographic images and ultimately to “draw” with light: the generation of image-elements by manipulation of the source laser light in hologram production. His technical innovations were driven by artistic goals: “to reach the subtler levels of perception” and to “hold a mirror up for thoughts”.

## Betsy Connors

Betsy Connors, (b. Cambridge, Massachusetts, USA) artist and educator has long been associated with the cutting-edge research and experimentation in light and holography at MIT. An alumna and former lecturer at the Media Labs’ Spatial Imaging Group, Connors also founded ACME Holography, one of the only private holography labs in the Boston area. A former fellow with MIT’s Center of Advanced Visual Studies, she was also the MIT Museum’s first curator and educator when the Museum acquired its now famous international collection of holograms and she continues to support the Museum. Connors has taught and exhibited her work throughout the world, and has won major awards and fellowships during her career. Locally her photography has been exhibited at the ICA, her video work has been broadcast on public television, and she is a founding director of the former Boston Film Video Foundation.

Connors work in holography is concerned with imagery from nature and environmental issues. She combines holograms in large-scale installations with computerized tools to manipulate the imagery in her work. The unusual interactive lighting and animation of the holograms in her 1996 exhibition Light Forest with floor, ceiling, and walls of holograms of rain forest imagery were controlled by then, state-of-the-art computer technology, including motion and proximity sensors. She continues to push the boundaries of holographic techniques in Light

Rain, the artwork exhibited in Luminous Windows. Some of the over seventy thin holograms depicting leaves, tree trunks, and branches, are moving - dropping down and slowly moving up. The holograms are suspended by filament attached to small motors overhead, programmed using a robotic controller creating subtle motion of some of the holograms spinning and reflecting eye-catching light out into the night. The transmission holograms move vertically while the light, reflecting off and behind the holograms, moves softly creating a water-like effect.

## **Paula Dawson**

Paula Dawson (Sydney, Australia) is an artist and Associate Professor of Fine Arts at the University of New South Wales, Sydney, Australia. Dawson is one of the foremost holographic artists, and has specialized in creating many of the world's largest laser transmission holograms. She has held residencies at the Laboratoire de Physique et Optique Besancon, France, RMIT applied Physics Dept. Melbourne Australia, the Holocenter New York and the Center for Advanced Visual Studies MIT, Cambridge MA. Her first major holographic work, *There's No Place Like Home*, 1980 is in collection of the National Gallery of Australia.

Dawson's PhD thesis covers the technical and aesthetic issues of her art and her practice with laser transmission holograms of real objects over two decades. In recent years Dawson has drawn on pictorial agents of early figurative Italian art which she has transposed to synthetically computer generated, real holograms, paintings, drawings, and bronze castings.

Dawson's contribution to the Luminous Windows exhibition at the MIT Museum is titled *ANN*, an original holographic portrait of Dr. Ann Lewis a collector, philanthropist, and the former director of Sydney's Gallery A.

The process of creating the portrait included visits with Dr. Lewis in her home to identify the imagery Dawson would access as she built a layered and personal portrait that paid homage to a woman who changed the artistic landscape of Australia with her vision, and her commitment to contemporary art. Dawson says of the portrait, "the work employs formal compositional devices, imagery and pictorial qualities intrinsic to holographic stereograms which will enable the viewer to understand Ann in a unique way, through the vivid changing colours she loves, her way of seeing, and the view the world has of her."

## **Ikuo Nakamura**

Ikuo Nakamura, an award-winning artist, originally studied physics at the Science University of Tokyo. In the early 1980's he moved to New York City to learn holographic techniques at the New York Holographic Laboratory. By combining his scientific background with his passion for art and holography, Nakamura developed experimental multimedia installations such as *Rainbow Dance*, a holographic pattern animation series, *Neuro Hologram*, a brain wave interactive hologram and *The Mirror*, an interactive space projected video image synthesizer. Nakamura was the director of technical creativity for the Center for Holographic Art in New York City.

## Holography

Procacci

NAEA 2014

Nakamura's contribution to the Luminous Windows exhibition at the MIT Museum is titled Thera, his 2004 hologram based on the painting, Madam X, by John Singer Sargent. Nakamura's holographic portrait of Thera, a performing artist in New York, mimics Sargent's original Madam X painting, which in 1884 scandalized the world with its suggested sexuality of a young socialite. The hologram is created using ruby pulse lasers and backlit digital projection that portray the interference between timeless holographic pure light volume, and a projected time-shifted flat image. Nakamura delves into the past and illuminates painterly and social conventions as they 'vibrate' into present day perceptions.

## Dieter Jung

Dieter Jung's work as an artist and a thinker had already introduced him to the possibilities of lightwave interference when he encountered holography: "In 1977, at the Museum of Holography in New York, I saw for the first time a light-color-air sculpture, an authentic mirage—a holographic stereogram." "I was paralyzed with fascination." In his earlier paintings and drawings, Jung wove line patterns into figures and objects. Holography enabled Jung to make optical realities of his artistic visions, to "weave" light wavefront interference patterns into colors, 3-D forms and spaces. He brings extensive historical and cultural knowledge of light and optics to his holography and he employs traditional art- media techniques in probing its artistic potential. Jung has consistently worked with scientists, often at MIT where he's had long association with the Media Lab and the Center for Advanced Visual Studies