

# Frequently Asked Questions about Laser Art

## Mike Gould, Laser Artist, In Charge, Illuminatus Lasers

### What are the main types of laser displays?

Laser shows can be divided into three main categories: beam shows, graphics, and lumia

Illuminatus Lasers at the University of Michigan EECS building.



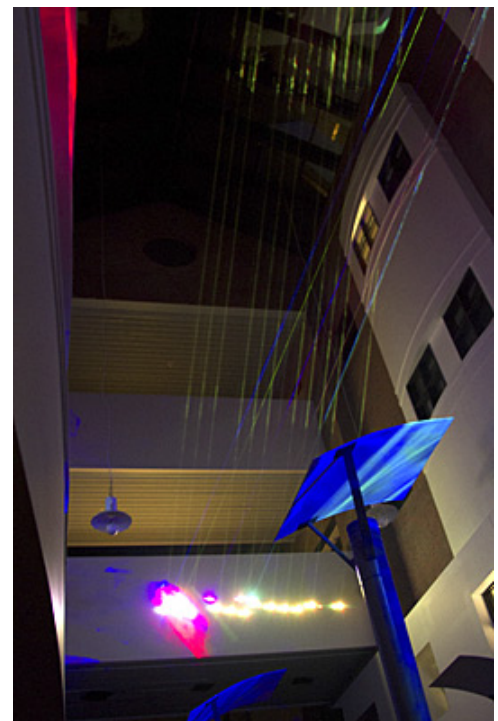
#### Beam shows

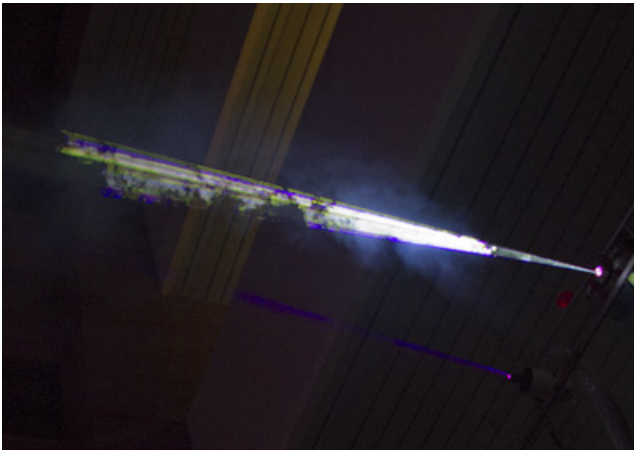
Beam shows are spectacular displays of laser lines shooting through space, indoors or out. This is a common feature of rock shows, and what most people think of when they think “lasers”. Laser projectors are wired to a laptop running special software to control the color, brightness and aiming of the beams.

The beams must be terminated, that is, the beams have to shine onto something; you can’t just aim beams into the sky unless you get permission from the FAA months in advance. Below you see beams terminating on a walkway at the EECS building atrium.

#### Haze

You can’t see the beams unless there is fog or haze in the air. This is usually provided by stage machinery called hazers and foggers. Outdoors, there is always the danger that wind will blow the haze away, leaving the beams invisible. Outdoor displays also require very powerful lasers, at least a 10W minimum. We can do this as well, but we would have to rent the lasers, which has to happen well in advance of shows.





## Haze Vs. Fire Alarms

An issue with indoors hazing is that the haze can trigger fire alarms. We always work with the venue, fire marshals, and alarm companies to prevent this. Some smoke detectors are triggered by haze, some aren't, so testing is always a good idea for indoor beam shows.

Beams cutting through the haze, indoors

## Graphics Shows

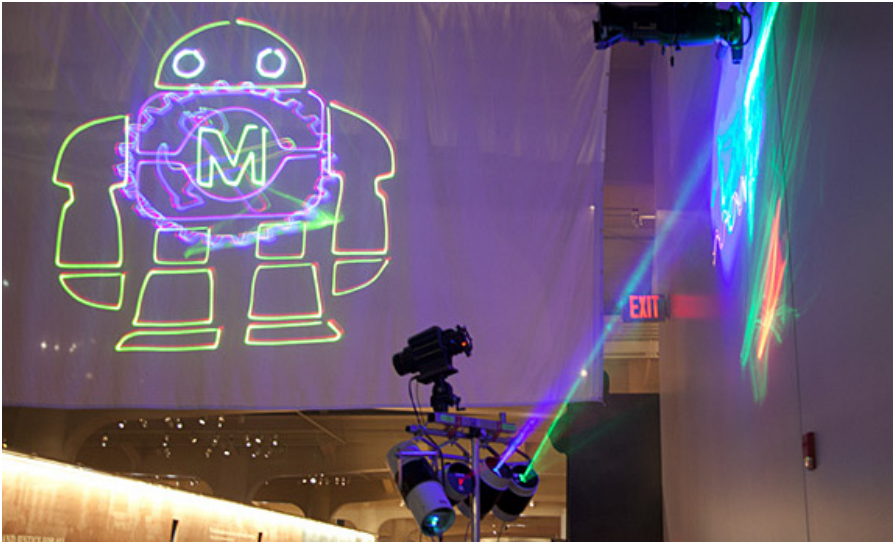
To project an image, such as a logo, scrolling text, or something pertaining to a specific event, the laptop controlling the projector instructs the laser projector how to move the laser to sketch out the picture. This is done by bouncing the laser beam off of galvos; special motors with mirrors on their shafts that guide the beam under computer control.

Like beam shows, laser graphics are controlled by special software; we use state of the art Pangolin Beyond, the industry standard. To the left is a recent show at the University of Michigan School of Electrical and Computer Engineering, where we used an image they supplied (as a JPG) showing a computer chip superimposed on a brain. In the foreground is the laptop running the show.

In addition to building all the projectors, Mike Gould is a photographer and graphics artist. He can take images, JPGs, TIFFs, or whatever, and process them (using Photoshop) into files the software can project.



It is important to know that the image will be an outline with embellishments, as above. Lasers don't project things like photographs, although they can produce images generated from photos, using outlines derived by sketching lines on top of images. And all this processing takes time; the more images you have in a show, the more expensive it gets to create the imagery. Simple things like most logos don't take much time, more complex images like the brain/chip above can take hours to process so that the lasers can deal with them. Here is an example from a show we did at the Henry Ford Museum in Dearborn, MI:

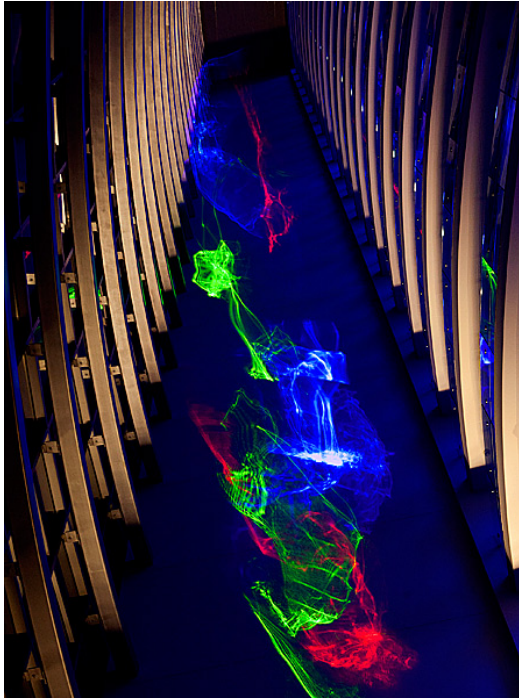


To the left is the logo of the event, projected onto a cloth screen. On the right you see some Lumiators projecting lumia on the wall. This logo was animated: the central gear revolved in one direction, and the hammer and wrench revolved in the other. Note that due to the scanning of the beam, photographing lasers is very tricky, sort of like taking a photo of an old-fashioned TV screen.



## Lumia

Lumia is a refinement of a technique created in the 1930s by light artist Thomas Wilfred. Here the laser beams are spread out and diffracted by rotating mechanisms, looking like the photo below.



This is the inside the 24-story atrium of the JW Marriott hotel during the 2012 ArtPrize competition in Grand Rapids, MI. The projection covered ~4000 sq. ft., and won us an ILDA Award.

More photos here:

<http://mikegouldlaserartist.com/webgallery/stratus10/index.html>.

To our knowledge, we are the only troupe in the country (maybe the world) who do lumia on this scale.

You can see a video of this effect at: <http://mikegouldlaserartist.com>

This particular video was made from the kinetic laser sculpture built into a vintage spotlight. This is a small-scale device designed for art galleries and the homes of collectors.

The projectors ("Lumiators") look like this, mounted on a heavy-duty theatrical lighting tripod.

We currently have 12 of these in various configurations and colors. They are constructed of sturdy PVC pipe, which encloses the mechanisms which are made of aluminum, motors, diffractor disks in glass or plastic, lasers, and electronics.

These are controlled by custom-made controllers:



As seen above, our shows combine lumia, imagery, and sometimes, beams.



## What experience do you have doing laser shows?

Mike Gould and the Illuminatus Lasers have been doing shows since our debut at the Penguicon Open Software/Science Fiction convention in 2009. The Illuminatus have been doing old-school lightshows since the mid-seventies, including the opening ceremonies for the World Science Fiction convention in Kansas City in 1976.

Our client list includes the University of Michigan (three shows including a Michigan Stadium night game), most of the local (Michigan) science fiction and steam punk conventions: ConFusion, DetCon I, Penguicon, World Steam Expo, Youmacon, etc., and a trip to Grand Valley State University for a lecture/demo on lasers for their Saturday Science Year of Light seminar. And we did a very involved half-hour show for the Saline Celtic Festival in the summer of 2015, involving more than 100 custom images, and a commissioned musical accompaniment with sound effects.

Mike has also built an interactive museum exhibit called *L is for Laser*, which has been seen at Midland's Dow Museum of Science and Art, and Ann Arbor's Hands-On Museum. He has also exhibited at the Ann Arbor Art Center's Tech+Art juried show, and at Detroit's juried DLECTRICITY event.

## How about custom images and Music?

Ah, our specialty. The above-mentioned Celtic fest involved a boatload of sketches, transformed into laser pictures to tell a 30-minute story of the *Quest for Mystic Fire*. Photos below:





**Are you insured and Varianced?**

We are insured to the tune of \$2M for liability. We are varianced, which means we are compliant with federal laser regulations and have been registered with the relevant authorities (CDRH).

**Where are you based?**

Our whirled headquarters is just north of Jackson, Michigan. We have mostly performed in southeast Michigan, but are equipped to travel just about anywhere. We did a show in Miami in March 2016, and a movie shoot in Salt Lake City in 2017.

**Safety**

According to federal regulations, laser beams used in beam and image shows must be kept as far away from the audience as possible, with a minimal distance of 3m. The area where the beams terminate must also be 2m away from the audience laterally, so barricades are sometimes called for.

**Estimated costs**

Due to the amount of equipment we haul around, the number of crew people needed to run the shows, and the often labor-intensive nature of preparing the graphics, our laser shows aren't cheap. Our minimum charge is \$2,000 for a fairly minimal show, usually just a few Lumiators. Outdoor shows start at \$10,000, if beams are required. If you are interested in having us do a show for you, your best bet is to contact one of our reps with a fairly detailed list of requirements. We can then figure out exactly what is needed on our end and get back to you with a quote.

**Are you online?**

Illuminatus: <http://illuminatuslightshow.com/>

**Any articles in local media?**

<http://www.annarbor.com/news/mike-gould-computer-whiz-photographer-and-laser-lightshow-artist/>  
<http://www.ecurrent.com/June-2015/Local-Color/#.VkoirIQZOi8>  
[http://www.ur.umich.edu/0910/Dec14\\_09/spotlight.php](http://www.ur.umich.edu/0910/Dec14_09/spotlight.php)

**National Media?**

<http://www.plsn.com/current-issue/49-features/12231-the-big-house-under-the-lights.html>

**International Media?**

<http://content.yudu.com/A2itiw/EONOV13/resources/index.htm?referrerUrl=> (go to page 20)

**Video Talks?**

Ignite talk: <https://www.youtube.com/watch?v=sCVSGmC2Ol0&list=PLjLXtAkB-wnJSUHEb6HLUV77wknBX50yk&index=9>  
Nerd Night talk: [http://www.aadl.org/aadl\\_nerd\\_nite\\_20150723-lasers](http://www.aadl.org/aadl_nerd_nite_20150723-lasers)

**Awards?**

2013 ILDA Award, Innovative Application, 1st Place: "Stratus 10"

<https://www.youtube.com/watch?v=EzhgLMxjyZE>

2016 ILDA Award <https://www.youtube.com/watch?v=rk6iA2vDmQk>

2017 ILDA Award

**How do I contact you?**

To book the Illuminatus Lasers, email [info@illuminatuslasers.com](mailto:info@illuminatuslasers.com)  
or call Mike at (734) 904-0659.