



Mapping Matter

By: Richard Cadena

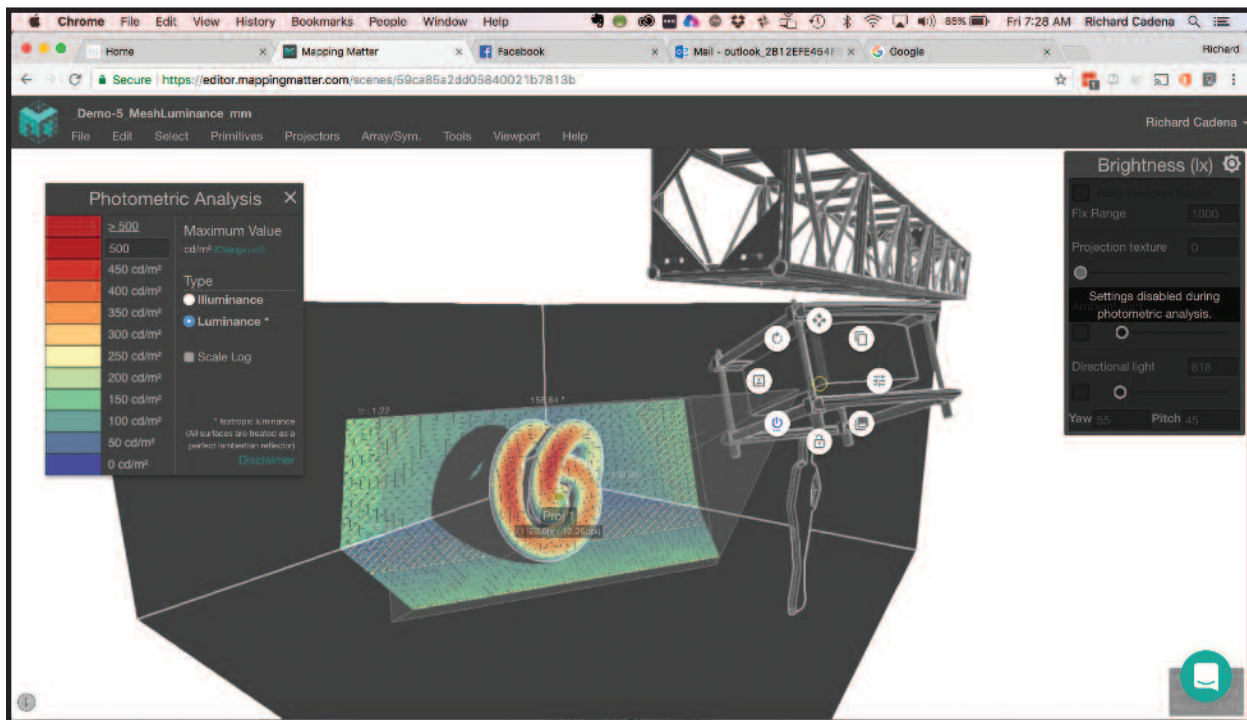
Those of us who grew up under the rule of Moore's law—the observation about how computers double in power approximately every year—might soon be able to catch our collective breath, because Moore's law has ended or is coming to an end, depending on whom you ask. So what now? Look for more and better software, thanks to stable and cheap hardware platforms and a new era of end-user-driven applications like Mapping Matter.

Mapping Matter is one of a new breed of applications popping up across our industry and it looks to be a winner. The web-based application, which runs in the Chrome browser, allows you to plan, design, test, tweak, and evaluate your multi-projector installations.

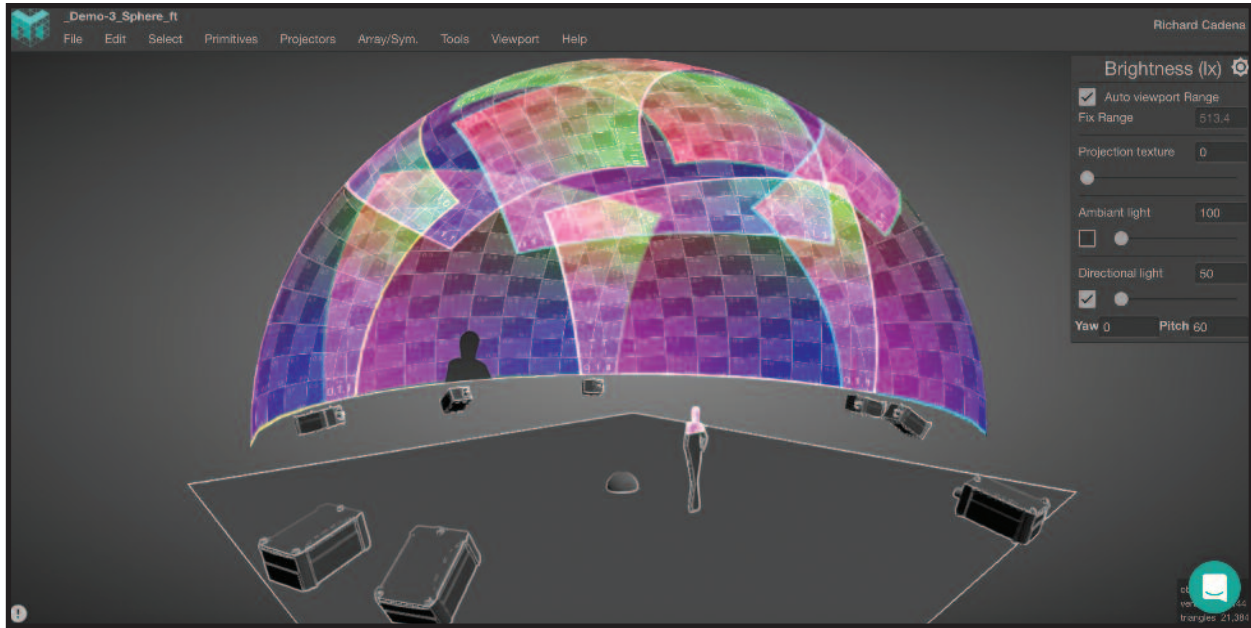
François-David Gagnon is the person behind the application. The idea was borne out of his work in the industry.

"I started to do a lot of technical design over ten years ago and I worked a lot with companies here in Montréal like Cirque du Soleil, Moment Factory, and GSM Project," he says. "I was always doing some sort of photometric analysis and 3-D using custom plug-ins that I would build to do mapping simulations. At one point, I discovered that I could do it all with WebGL."

WebGL, or Web Graphics Library, is



Mapping Matter allows you to mock up a project in a virtual 3-D environment and evaluate your projector placement. It has a photometric analysis tool that displays an intensity map of the projection on a surface.



You can import OBJ or DAE files of your stage or set, or create your own set, using parametric geometries. There is also an array tool that allows you to quickly and easily configure multiple projectors or objects in a linear or polar array.

an application program interface (API) that can be used for rendering interactive 2-D and 3-D graphics within a web browser. François thought it was an interesting way of working, that it would make for a great business model, so he turned his attention to developing an app. Five years ago, he hired a developer and off they went.

The stand-alone program is designed for pre-production planning, so it doesn't output video. What it does is to help you mock up a project in a virtual 3-D environment and find the best projector placement. When you start the app, there is nothing but a ground plane grid in the editor window, but you can import OBJ or DAE files of your stage or set, or you can build your own set, using the included parametric geometries. There are nodes, planes, boxes, circles, cylinders, spheres, equirectangular domes, a dome master, icosahedrons (a 20-sided polyhedron), toruses, and torus knots. You can resize them, position them, rotate them, apply textures with UV mapping, and more.

(As a side note, an equirectangular dome allows you to map a flat rectangular image to a sphere or dome. If

you google "equirectangular projection," like I did, you'll find some interesting information about maps dating back to 100 AD)

You can quickly create a generic projector, customize it with your own 3-D mesh, name, brand, model, lumens, and native resolution, and add it to your library. You can then configure the lens shift and position it where you want it with the right rotation and projection angle. You can also change the throw ratio a number of different ways, quickly and easily, and the magic of the software will provide you with the illuminance, in lux or footcandles, and the pixels per inch being projected onto a surface, which is very handy for quickly evaluating end results. A stacking tool in the projector properties panel makes it easy to stack multiple projectors, so you can focus two or more on the same target. You can even add an image or video to the projector or apply it directly to a 3-D surface and it will display the results in real time. It's a great way to visualize your pixel mapping and projection project.

For more technical analysis, a photometric tool displays an intensity map

of the projection on a surface. You can choose between illuminance in lux or footcandles or luminance (based on a perfect Lambertian reflector) in candelas per square meter, candelas per square foot, or foot lamberts, and it provides a color-coded map of direct lighting isotropic intensities. For a regular surface, like a projection screen, it's a very quick indicator of the brightness of the subject, and for an irregular surface, it's a study in complex projection, giving you a realistic picture of what to expect on the job site.

The software comes with some handy tools like arrays, symmetries, annotations, and dimensions. The array tool allows you to create linear or a polar array. When you want to produce a render, you can adjust the settings of the camera to capture the exact position and field of view that you need. Once you have your scene set, you can very easily render it as a beautiful 4,000-pixel-wide PNG file. You can also create a PDF file of a rendered scene with your logo and title block that includes important information like the date, version number, page number, and any descriptive information you would like to include.

When your design is complete, you can print a list of projectors that is nicely formatted with the name you gave each projector, quantities of each, model, native resolution, lumen output, throw ratio, position in X, Y, and Z coordinates, and the orientation. You can also export the projectors in a 3-D OBJ file along with their settings in a CSV format.

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Like other 3-D applications, you can change your point of view in the main viewport by choosing perspective, top, bottom, right, left, front, and back. You can insert objects and position them using the properties panel or by using one of the many software tools and shortcuts provided. In many ways, the GUI looks and feels much like a high-end 3-D application like Cinema 4D or Blender with syntax like left click to drag, scroll to zoom, right click and drag to orbit, and change the measurement units on the fly.

All in all, it seems very intuitive and powerful, but just in case you get stuck, there are a number of really good tutorials to guide you. I'm told that there are power users who are using Mapping Matter with high-resolution meshes including laser scans of buildings and theatres, and the list of users is rapidly growing.

There is a free 14-day trial and, if you like it, you can choose from one of three tiers including Solo (one user) for \$39 per month, Light (one seat, two user accounts) for \$49 per month, and Plus (one seat, three user accounts plus one hour per month of project support) for \$99 per month. It's just in time to take your breath away again. 