# ABE MEGAHED

For more information and examples of my work, please see my portfolio web site:
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## Profile

I'm a software developer with 30 years experience and have expertise in the fields of web development, cloud based collaboration and communication tools, 3D visualization and graphics, simulation based training, compiler and programming language design, robotics simulation, and many other areas. I enjoy working on the technology side as well as in product definition, user experience optimization and business development. I bring a sensible and grounded approach and am easy to work with. Though I work with machines, I strive to build beautiful and useful things that make life better for people.

## Experience

### Data Science Institute
### University of Wisconsin Madison - March 2021 to present
### Simulation and Web Developer

I developed a weather data collection and management system for an autonomous robot simulation. This involved writing scripts to download and format weather data from various sources, automated scripts for processing and converting data, and writing a web application to display weather data, combining various types of weather data in an integrated interactive map display.

### Morgridge Institute for Research — March 2012 to March 2021,
### Lead Web Developer, Software Assurance Marketplace
### Madison WI

I was the lead web developer for this $25 million project sponsored by the Department of Homeland Security. This project involved constructing a web application that software packages to be uploaded and analyzed for potential flaws and security vulnerabilities using a variety of static analysis tools and High Throughput Computing using HTCondor. I developed the front end using Javascript and a variety of frameworks and the back end web services using the PHP framework, Laravel.

### EarthIT — December 2011 to March 2013,
### Technical Manager / Web Developer
### Madison WI

While working at EarthIT, I built a web based medical information system for nursing homes designed to run on an iPad and to be used to collect information from and

convey educational information to patients. I also created a number of simple mobile apps for the iPhone and Android using Cordova/PhoneGap.

**Hypercosm LLC, A Division of Orbital Technologies Corporation / Sierra Nevada Aerospace — September 2001 to July 2011**
**Training and Simulation SBU (Division) Manager**

I ran the Hypercom simulation division (one of five in the company) which employed 2 to 9 people and created 3D training simulations for a variety of markets including aerospace, defense, architecture and urban planning. For NASA, we worked with JSC to build training simulations for scientific payloads, the SPDM robotic arm and the COLBERT treadmill. For the DoD, we created training simulations for the V-22 and F-35, helicopter simulations with weather effects and microgames for health training. I lead the direction of both internal and commercial software products and performed project management of content projects. I also worked on C/C++ programming and developed web applications using HTML / Javascript and my own 3D scripting language.

**Hypercosm Inc.**
**Founder and CTO - June 1998 to June 2001**
**Chairman - March 1999 to June 2001**
**CEO - March 1999 to October 2000**
**Madison, Wisconsin, San Jose, California, and Walnut Creek, California**

I founded Hypercosm to pioneer instructional 3D graphics technology for the Internet. Hypercosm employed over 30 people at its peak. Our simulations were featured on the New York Times web site and used by companies such as Cisco, McGraw-Hill, and the National Science Center.  I worked with Howard Charney (Cisco VP) and Larry Landweber (internet pioneer) and met with industry leaders including Mark Andreesen (Netscape cofounder), Bruce Dunlevie (Benchmark partner), Jaron Lanier (VR pioneer), and Kurt Akeley (OpenGL creator). I published and spoke at various industry conferences such as Siggraph. My duties included technical direction, product design and development, business development, application and market strategy, marketing, management of content creation, and sales.

**Leapfrog Inc.**
**Interface Designer and Programmer – August 1995 to May 1996**
**Subang Jaya, Malaysia**

I created a video-on-demand interface in Visual Basic under contract with the National Phone Company of Malaysia. This interface merged user interface elements from Visual Basic with design elements created using 3D graphics.

**Gravity Inc (formerly VPL, founded by Jaron Lanier)**
**Video Game Programmer – February 1995 to July 1995**
**San Francisco, CA**

I wrote a DOOM like video game featuring the Swedish Chef from the Muppets (which was finally released in 1996 as 'Muppets Inside' from Starwave). I worked with one other programmer, digital artists and project managers.

**Cosmic Software Corp.**
**Founder and President – October 1993 to December 1995**
**Madison, Wisconsin**

I founded Cosmic Software, a small two person software company, to develop and market a high performance photorealistic 3D graphics and rendering system. Duties included technical direction, advertising, customer relations, sales and distribution.

**IBM Thomas J. Watson Research Center**
**Graphics Researcher – June 1991 to December 1991**
**White Plains, New York**

I developed techniques for sectioning solids and detecting interferences using Z-buffer hardware. For the new algorithms that I invented, I received 2 patents. Published in Siggraph 1992. Worked with 3D graphics pioneers such as Jarek Rossignac, Alan Norton, and Jim Kajiya.

## Patents

- Patent #US6426748 – 7/30/02
  Data Compression of Interactive Figures for Electronic Book

- Patent #US05428716 - 6/27/95
  Solid Clip Methodology and Architecture for Clipping Solid Models and Displaying Cross Sections Using Depth Buffers

- Patent #US5497453 - 3/5/96
  Method and Apparatus for Detecting and Visualizing Interferences Between Solids

## Publications

- Siggraph 1992 technical paper "Interactive Inspection of Solids: Cross- sections and Interferences"

- Siggraph 1999 technical sketch "Real Time Shadows, Reflections, and Transparency using a Z buffer / Ray Tracer Hybrid"

- Siggraph 2000 Web 3D Roundup article "Hypercosm: Making 3D Programming Accessible"

## Education

**B.S. in Computer Science, University of Wisconsin, Madison**
**May 1991, 3.1 GPA**

## Skills

- Experienced at web development using HTML, CSS, Javascript, PHP and SVG / DOM programming

- Experienced in front end web programming using Javascript frameworks including Jquery, Marionette, Backbone, Underscore, Jquery Mobile, Jquery UI, Less (CSS), and others.

- Experienced in back end web programming and developing REST APIs using PHP, SQL, and frameworks such as Laravel.

- Experienced in hosting, administering and running websites using platforms such as AWS and Linode.

- Fluent in Javascript, PHP, C, C++, Delphi, VB, CSS, HTML, XML, Java, OMAR

- Successful at managing large scale software projects involving hundreds of thousands of lines of program code and teams of programmers

- Experienced in designing programming languages and implementing compilers and interpreters

- Experienced using graphic design tools such as Adobe Photoshop and Illustrator, won a national Addy award in 1999 for product design.

- Experienced in large document creation using desktop publishing tools such as FrameMaker, InDesign, and Microsoft Word.  Have written 4 technical manuals over 200 pages in length

## References

**Tom Bricker**
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**Chris Johnson**
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## Samples of Past Projects:
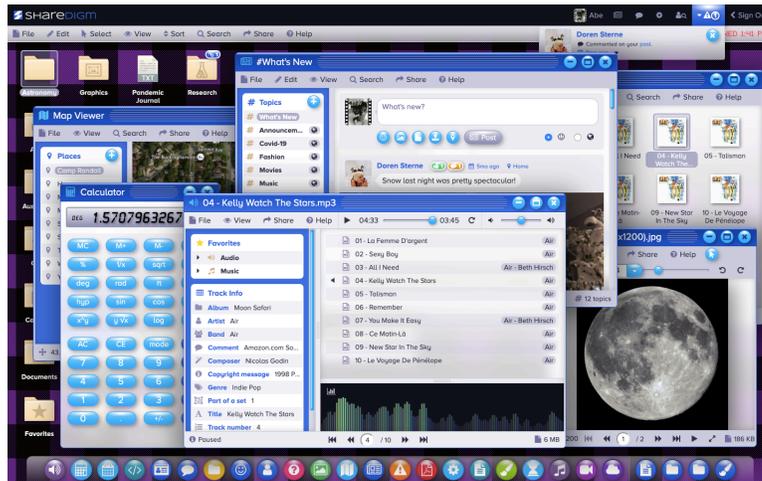


**Sharedigm**

Sharedigm is a web based operating system and collaboration system that I designed and implemented.   It encompasses file sharing, photo viewing and sharing, social networking, direct messaging and more.  It's currently available online at www.sharedigm.com .
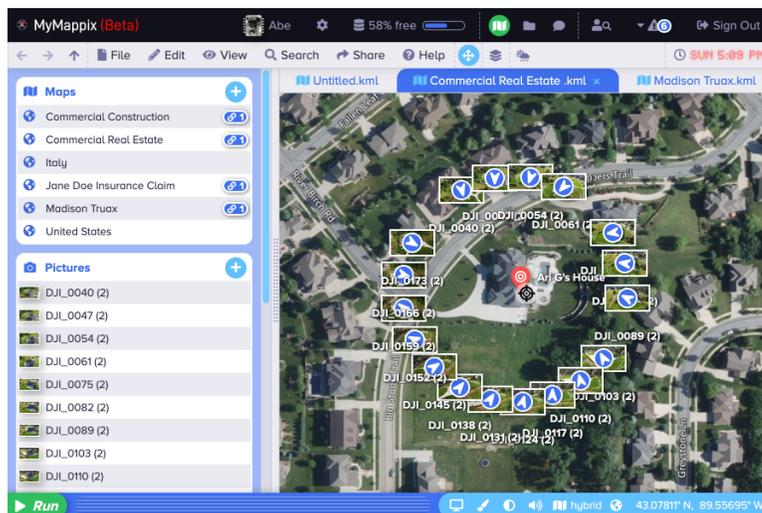


**MyMappix**

MyMappix is a web based platform for visualizing and managing geolocated aerial imagery.  It is intended for use by drone pilots and is online at: www.mymappix.app .
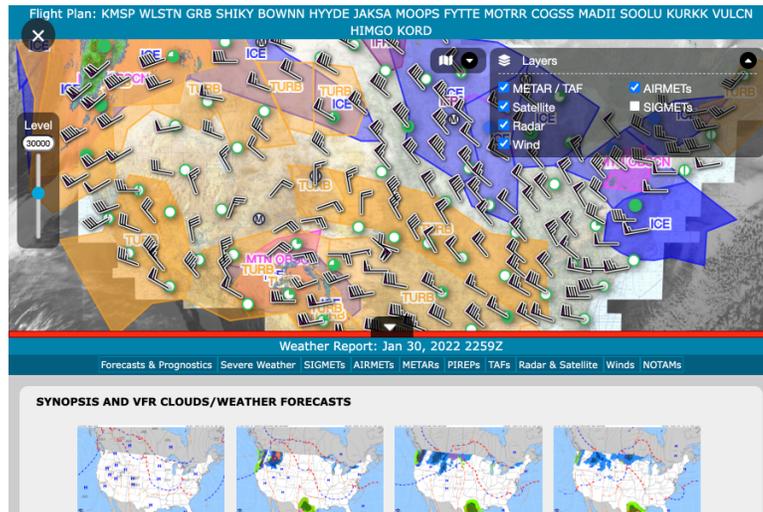
**ClimaDrive**

ClimaDrive is a web based application for displaying pre-flight weather briefing reports for pilots.    I designed and wrote the front end map display and wrote the back end for downloading and processing weather data from various government sources. Climadrive can be accessed at: www.climadrive.com .
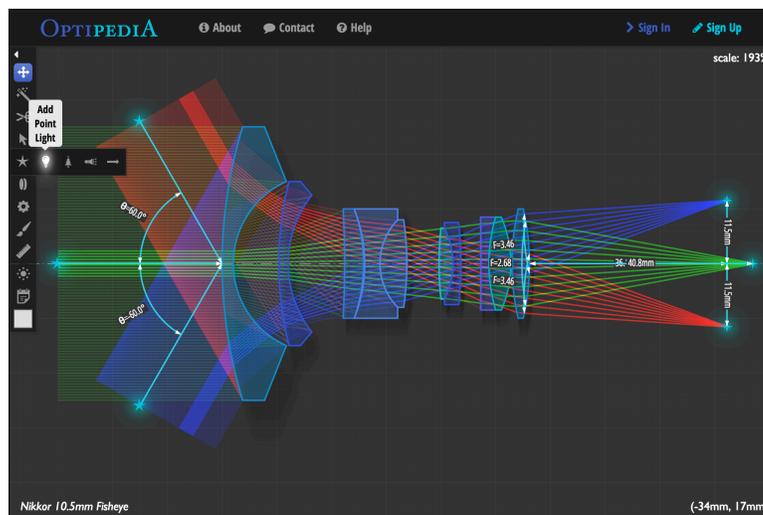


**Optipedia**

Optipedia is an experimental project to build an optical ray tracing and analysis package that is entirely web based.  The rendering is done using SVG graphics and the simulation is all performed in Javascript.

**COLBERT Treadmill Assembly Simulator and Trainer**

I wrote the COLBERT Treadmill Assembly Simulator and Trainer for NASA to be used on orbit to assembly the treadmill that is currently in use on the International Space Station.  It was built using the Hypercosm 3D web technology that I invented.
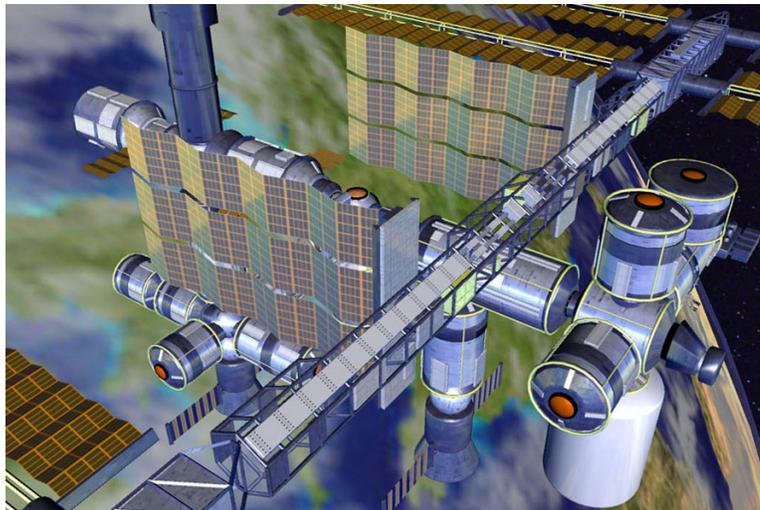


**SAFER Astronaut Jet Pack Simulator**

I built the SAFER jet pack instructional simulation for the Kansas City Cosmodrome. I worked on the simulation with astronaut Mark Lee who co-developed the SAFER jet pack and first flew it in space.
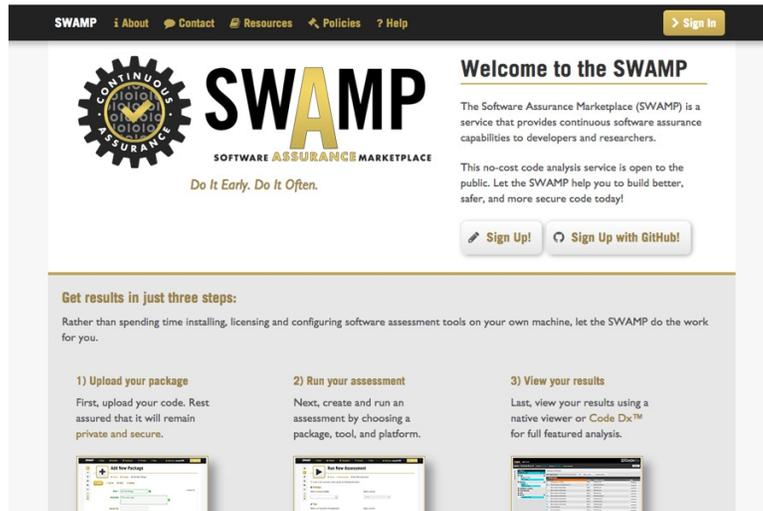
**Software Assurance Marketplace**

This is web application that I wrote for the Software Assurance Marketplace, a $25 million cybersecurity project at the Morgridge Institute for Research. The web application allows you to upload code, analyze it for potential flaws, and view the results.The server side is written using PHP and the Laravel framework and uses HTCondor to run software analysis jobs.



RocketWatches.com

RocketWatches.com is a commercial web site that I ran for several years that dealt with vintage wristwatches. I designed and implemented the web site, and received numerous complements on the design.
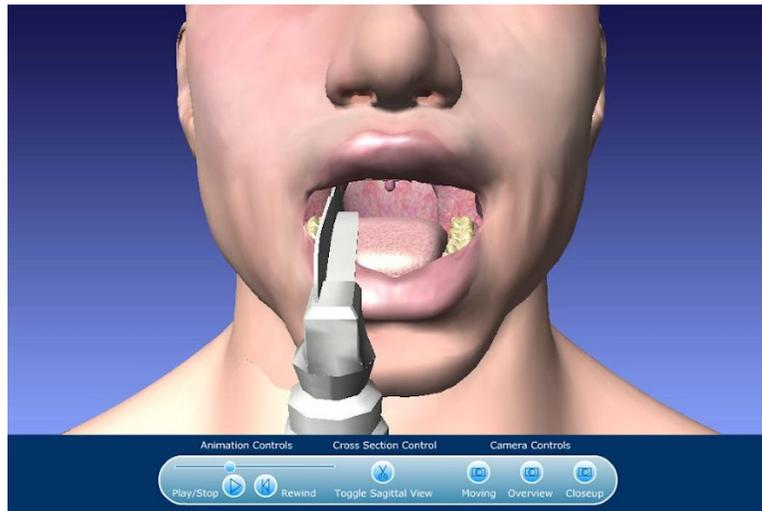
**Intubation Trainer**

The Intubation Trainer was a web based procedural trainer for instructional training on emergency medical procedures.  It uses Hypercosm technology for the 3D display and a Flash based interface for the user interface controls.
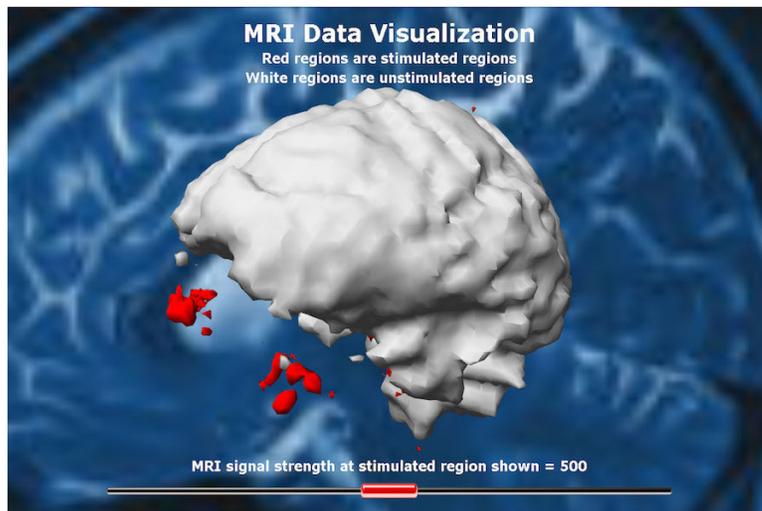


**MRI Data Visualization**

I built this MRI data visualization to show activated regions of the brain and optic nerves.  The software is able to parse and dynamically process the MRI data from image data into 3D renderable iso-surfaces.

**Hypercosm Teleporter - 3D Markup and Annotation for Commercial Applications**
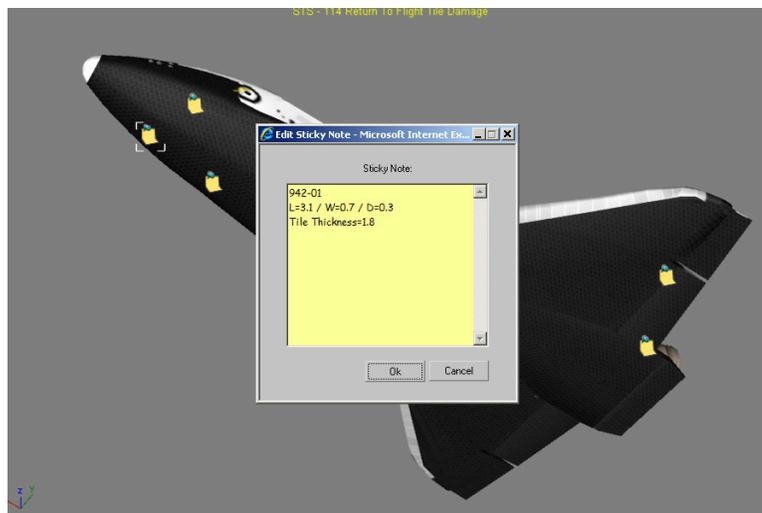


**Hypercosm Teleporter - 3D Markup and Annotation for Aerospace Applications**

Hypercosm Teleporter was a commercial software application that I created that allowed you to create web based 3D applications for 3D communication and collaboration.   It featured various annotation, markup, measuring and collaboration tools.