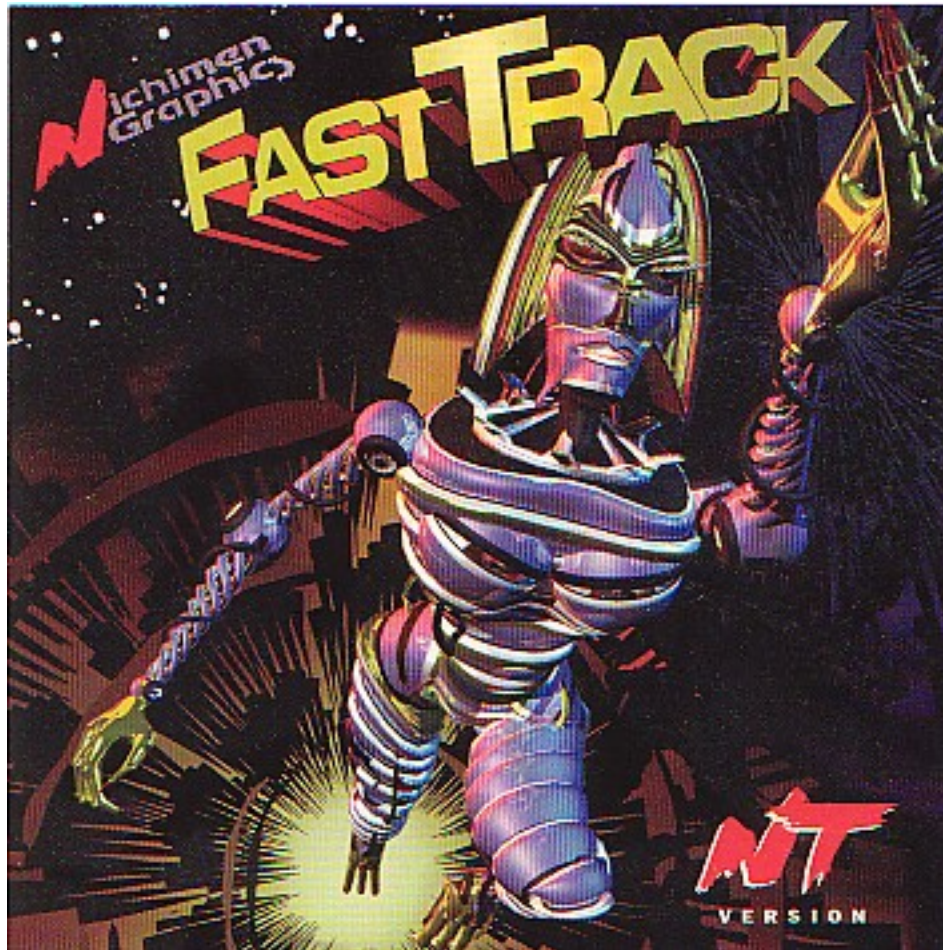


Computer Graphics

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[Fast Track](#)

See [Game Resources](#) for real-time and interactive 3D links.

[Spiraloid](#) hosts 3D tips and tutorials.

[Siggraph](#) is the premier gathering of graphics researchers, artists and engineers. [National Association of Broadcasters](#) is another show that features lots of hardware.

For a variety of research topics, see [David Baraff](#) for physically-based modelling, [Jim Blinn](#), [Paul Debevec](#).

Recommended reading includes [Graphic Gems](#) series. and books by Jim Blinn. See [game development resources](#) for reading on real-time graphics.

1. Open Source and Standards

1.1. Scene Graphs

[OpenSceneGraph](#) is descended somewhat from [Fahrenheit](#) while [OpenSG](#) is descended more from [Performer](#)

1.2. OpenGL

[OpenGL](#) is the cross-platform immediate-mode 3D API. [Mesa](#) is an open source OpenGL workalike. The [Khronos Group](#) promotes OpenGL ES for small platforms. [Collada](#) is an XML schema for 3D descriptions.

1.3. Java

For open source development in Java, you can use an OpenGL binding such as [JOGL](#) or a scene graph API such as [Java3D](#) or [xith3d.org](#). [java3d.org](#) and [j3d.org](#) have more information on Java3D. The [Looking Glass](#) 3D desktop is implemented in Java3D.

1.4. Python

Similarly, for Python, there's [PyOpenGL](#) and a scene graph API [Panda3D](#). [Python 3D](#) lists applications.

1.5. Image Libraries

Open source image format libraries include [libpng](#), [libtiff](#), [libjpeg](#), and [FreeImage](#). [FreeType](#) provides font support. [OpenType](#) is an open standard for font descriptions. [Image Magick](#) provides image manipulation, [OpenEXR](#) is a high dynamic range file format and library from [Industrial Light and Magic](#).

1.6. Visualization

[Osirix](#) is a MacOSX package for medical imaging. [Celestia](#) is a nifty astronomy visualization package with add-ons available on the [Celestia Mother Lode](#)

1.7. Machine Vision

[TINA](#) and [OpenCV](#) provide machine vision processing.

1.8. Web 3D

The successor to VRML is



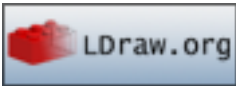
[X3D](#)

. Open-source browsers include [XJ3D](#) and [FreeWRL](#) (which also supports VRML)

Web3D tools running on MacOSX are listed on [MacWeb3D](#).

The [game development page](#) also lists game engines and Flash extensions that support browser-based game deployment.

1.9. CAD

Open Cascade	
 LDRAW	Unofficial software library of Lego parts
Mac Brick CAD	Mac editor using LDRAW

1.10. Image Tools



[GIMP](#)

and a high-end derivative, [Cinepaint](#). [Inkscape](#) creates vector graphics, in particular [SVG](#) documents.

1.11. Modellers

[Wings 3D](#) implemented in [Erlang](#), uses the [winged edge](#) data structure, a [subdivision](#) method that has some advantages over the [half edge](#) data structure. See [course notes](#) and [original paper](#).

Create models with



[Blender](#)

, [Art of Illusion](#), implemented in Java.

1.12. Renderers

[Ray-tracing](#) renderers include [POV-Ray](#), [Radiance](#) and [YAFRay](#).

2. Commercial Tools

2.1. 3D Desktops

[Universe](#) generates starfield images.

2.2. Panoramas



oil field

[Panotools](#) hosts the panorama community and [Pangea Software](#) provides panorama tools and services.

[Diard Software](#) provides the Universe Image Creator.

2.3. Asset Management

[Alienbrain](#)

2.4. 3D

[3DNA](#) is a 3D desktop for Windows.

[Alias](#) and [Discreet](#) for content creation. Lower cost tools include those from [Curious Labs](#),

[Ulead](#), [Luxology](#), [Pixologic](#), and [Sketchup](#). Shareware offerings include [Milkshape3D](#), a popular modeller for game mods, and [Cheetah3D](#), written specifically for MacOSX.

[Terragen](#) and [World Machine](#) are used for terrain creation. The [Virtual Terrain](#) project offers open source tools for terrain generation.

2.5. For Kids

[Kid Pix](#) is a long-standing illustration package for children. [Cosmic Blobs](#) offers a similarly slick package for 3D scene creation and animation.

3. Resources

3.1. 3D Galleries

[3D Cafe](#) lists jobs, tutorials and models. [Renderosity](#) features renderings. [WordsEye](#) allows natural language creation of 3D scenes. [3D Buzz...](#)

3.2. 3D Models

[TurboSquid](#) and [3DModelWorks](#) list free and for sale models. [Military](#) models.

3.3. Textures

[CGTextures.com](#) has free 3D-ready textures. Astronomy textures are available from



[JHT's Planetary Pixel Emporium](#)

, [JPL Space Simulator](#) and [Bjorn Johnson](#)

3.4. Fonts

[Web Page Publicity](#) and [Divide By Zero](#) offer free fonts.