

Spencer T. Parkin

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- OBJECTIVE** A position in the field of software engineering with special interest in tools and core engine technology for video game development.
- EDUCATION** *Bachelor of Science, Mathematics*
Weber State University, Ogden, UT, Graduated 2007
Major: Mathematics
Minor: Computer Science
Graduated High School 2001
- COMPUTER SKILLS** *Languages & Software:* C/C++, Lua, C#, Java, Assembly, SIMD/Intrinsics, HLSL, Perl, Git, OpenGL, MFC, wxWidgets, cURL, DevStudio, boost.
Operating Systems: Windows, Linux.
- EXPERIENCE** *Programmer* 2012-2016
Avatar Tools Team, Programming Department, **Disney Interactive**
- Single-handedly developed the following new tools from the ground up to increase team productivity.
 - **Custodian** – Lua-driven, general purpose wizard tool designed to lead the user through a dependency graph of esoteric steps.
 - **Emu** – A tool presenting its users with a visual programming language used to create executables for our engine run-time VM. It featured full undo-redo, dynamic graph layouts, graph animations, cut-copy-paste, and drag-drop, just to name a few.
 - **Progression Editor** – A tool level-designers would use to map out each character's progression potential in game.
 - Maintained existing tools – fixed bugs, added new features, optimized performance, improved visuals. Highlights include the following.
 - **GCM Editor** – Solved massive graph-layout problem in terms of visuals and performance using my own idea of overlapping spanning trees. Added break-point features for existing tool-to-engine connectivity.
 - **AnimTree Editor** – Added telemetry panel visualization for real-time capturing of instrumented anim-tree events for diagnostic purposes.
 - Developed new features in our proprietary windowing framework.
 - **Twin-Sliders** – Implemented twin-slider control for range-picking.
 - **Word-Sort** – Implemented word-sort control with nifty drag-drop animation.
 - **Scintilla** – Incorporated the Scintilla control into our controls library.
- Associate Programmer* 2007-2012
Rendering Team, Programming Department, **Disney Interactive**
- Single-handedly developed particle authoring tool from the ground up with live-authoring features. Wrote both client and game-side support for live-authoring.

- Wrote particle processing command-line tool for LIP engine-file generation.
- Wrote shared library for particle authoring tool and the particle processing command-line tool.
- Wrote GPU shader math code in HLSL to support all particle system features in the context of the GPU's hardware instancing feature.
- Wrote CPU math code to support all particle system features on the Wii. Wrote CPU-side instancing to make up for the Wii's lack of hardware instancing capability.
- Implemented lens-flare system from tools to pipe-line to engine-rendering using DirectX's occlusion culling feature.
- Implemented emitter-shapes feature for the particle system so that artists could emit in volumes, on surfaces, and on splines.
- Ported old particle system to new renderer.
- Wrote GA-compatible matrix math library.
- Wrote 2D-GA math library. Most of the code was generated by a command-line program I wrote.
- Optimized existing matrix and quaternion-based math routines using assembly, intrinsics and SIMD registers.
- Optimized CPU-side particle-buffer processing using assembly, intrinsics and SIMD registers.
- Wrote entire HOG file-archiving system including shared library, command-line utility, and windows-based GUI tool using wxWidgets.
- Wrote Perl script to sniff out all asset usages per level for the entire game for pre-caching purposes to eliminate run-time hitches.
- Fixed many hard-to-find memory-corruption bugs and graphics glitches during crunch modes.
- Wrote tetrahedral-based convex hull-finder algorithm.
- Wrote scene-file merging utility.

Lab Aide 2003-2007
Worked as a lab aide to pay for books during the college years.

Level 1 Programmer 2001-2002
UI Programming, **Acclaim Entertainment**

- Worked with artists and designers as sole programmer on main front-end user-interface for Legends of Wrestling II.

Programming Intern 2000-2001
FX Programming, **Acclaim Entertainment**

- Worked on the particle system. Implemented blood/sweat splatter for Legends of Wrestling I and various other particle effects.
- Implemented body-part resizing subroutine for create-a-wrestler feature.

PROJECTS

I was involved in the following video game projects, sorted by developer; projects sorted chronologically.

Acclaim Entertainment
Legends of Wrestling I, Legends of Wrestling II.

Disney Interactive
Bolt, Toy Story 3, Cars 2, Infinity 1, Infinity 2, Infinity 3.

PERSONAL PROJECTS

The following are computer programs I've written out of personal interest. Source code for all of these projects can be found here: <https://github.com/spencerparkin?tab=repositories>

- **CalcLib** – A static library providing numeric and symbolic calculation support. Unlike most calculators, this one understands geometric algebra.
- **GAVisTool** – Built upon CalcLib, this is a tool for exploring and experimenting with conformal geometric algebra. It also utilizes a BSP-tree to do real-time alpha-sorting.
- **GALua** – A Lua module that exposes the capabilities of CalcLib.
- **CSharpMaze** – A rectangular and circular maze generator written in C#.
- **ChineseCheckers** – A wxWidgets-based application utilizing OpenGL's selection mechanism. It is also multi-player as it can host and connect to a game session using sockets.
- **RubiksCube** – Another wxWidgets-based application utilizing OpenGL's selection mechanism. Any Rubik's Cube of degree 3 or higher can be simulated. An algorithm is provided that can find a solution to any such scrambled cube. The solution sequence is animated.
- **ImageGenerator** – A multi-threaded image generator that can generate fractals and ray-trace scenes specified in XML. It can also render video clips using FFmpeg.

PUBLICATIONS The following publications are given in chronological order.

- Parkin, S. (2014). The Mother Minkowski Algebra of Order M. *Advances in Applied Clifford Algebras*, 24(1), 193-203.
- Parkin S. (2014). The Intersection of Rays with Algebraic Surfaces. *Advances in Applied Clifford Algebras*, 24(3), 309-815.
- Parkin, S. (2015). Versors That Give Non-Uniform Scale. *Advances in Applied Clifford Algebras*, 25(1), 219-225.
- Parkin, S. (2015). An Introduction To Geometric Sets. *Advances in Applied Clifford Algebras*, 25(3), 639-655.

SPECIAL INTERESTS

- Group Theory – An absolutely *beautiful* theory with applications ranging from solving Rubik's cubes to quantum mechanics.
- Geometric Algebra – A mathematical framework combining the capabilities of matrices and quaternions into one algebraic system.
- The Conform Model – A model of geometry based upon geometric algebra in which round and flat things become the elements of the algebra.
- Rubik's Cube-Type Puzzles – I can solve many types of such puzzles, and find my own solution-methods to such puzzles.

REFERENCES AVAILABLE UPON REQUEST