Curriculum Vita

Wayne O. Cochran
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Research and Technical Interests

Computer Graphics, Geometric Modeling, Rasterization, Real-Time Rendering and GPU Programming. My career in computer graphics started by implementing rasterization firmware for industrial graphics boards based on TI's TMS34010 line of graphics processors. Later I developed a 3D rendering system that used the TMS34082 floating point coprocessor. Essentially I was programming GPU's long before the current wave of GPU coding become popular. Later, during graduate school, I developed an interest in a class of fractal models that were used for compressing images at unusually high bit rates. I extended these algorithms (along with methods based on the DCT) to compress 3-D volumetric data produced by CT and MRI machines. Following this, I developed a variety of methods based on fractal interpolation functions to model and render intricate curves and surfaces. I remain interested in modeling complex surfaces and textures with fractals and I am investigating techniques inspired by Wang Tiles to generate infinitely detailed structures. Due to the availability of cheap video hardware, GPU programming has now extended beyond the realm of computer graphics. General Purpose GPU (GPGPU) techniques are also an interest of mine. I enjoy programming Apple's mobile devices, the iPad and iPhone, which utilize embedded GPU's.

Education

- **Ph.D.** Computer Science, 1998, Washington State University.
  Dissertation Title: "A Recurrent Modeling Toolset."
- **M.S.** Computer Science, 1994, Washington State University.
  Thesis title: "Fractal Volume Compression."
- **B.S.** Mathematics, cum laude, 1990. University of Washington.

Professional Experience

- **Clinical Assistant Professor**, 1999-present, Washington State University Vancouver. My original position was on a tenure track, but was later switched to a clinical position to match teaching interests. Courses taught at WSUV: *Mobile Application Development, Programming Tools, Automata and Formal Languages, Numerical Computing, Programming Language Design, Operating Systems and Computer Architecture, Introduction to Computer Graphics, Advanced Computer Graphics, Theory of Computation* and *Compiler Design.* I am heavily involved in program development for the computer science program which started in the fall of 1999. Research involves intricate surface and texture modeling using recurrent models and Wang Tiles. I also have high interest in OpenGL and GPU programming for both graphical applications and general purpose parallel computing.
- **Instructor**, 1998-1999, Washington State University. I performed research and taught courses in Introduction to Microprocessors, C Programming, Windows Programming, Computer Networks, and Java Programming.

- **Research Assistant**, 1994-1998, Washington State University. My research included volumetric compression using fractals, and other techniques using fractals to model complex geometry (*e.g.,* rough curves and surfaces). Research was part of the *Recurrent Modeling Project* funded by Intel and a grant from the NSF.
- **Research/Teaching Assistant**, 1992–1994, Washington State University. Contributed research for and implementation of knowledge based systems. Lab instructor for introductory computer programming courses.
- **Software Engineer**, 1990-1992, Raster Graphics Inc (assets acquired by Peritek Corporation in 2001) `http://www.rastergraf.com` 1804-P SE First St. Redmond, Oregon 97756 (541) 923-5530 Job Overview: Design and implementation of rasterization firmware for industrial graphics boards. Design and implementation of 3D rendering libraries.

Publications

1. Wayne O. Cochran, Recurrent Interpolation Surfaces, *Proceedings of the Western Computer Graphics Symposium,* March 2003, pp. 9–15.

2. Wayne. O. Cochran, R. R. Lewis, J. C. Hart, The Normal of a Fractal Surface, *The Visual Computer,* vol. 17, no. 4, April 2001, pp. 209–218.

3. Wayne O. Cochran, Fractal Interpolation Surfaces for Digital Elevation Maps, *Proceedings of the Western Computer Graphics Symposium,* March 2001, pp. 8–14.

4. Wayne O. Cochran, A Recurrent Modeling Toolset, Ph.D. dissertation. Washington State University, December 1998.

5. Wayne O. Cochran, John C. Hart, Patrick J. Flynn, On Approximating Rough Curves with Fractal Functions, *Proceedings of Graphics Interface,* June 1998.

6. J.C. Hart, P.J. Flynn, W.O. Cochran. Similarity Hashing: A Model-Based Vision Solution to the Inverse Problem of Recurrent Iterated Function Systems. *Fractals 5* April 1997, pp. 39-50.

7. Wayne O. Cochran, John C. Hart, Patrick J. Flynn, Hashing Fractal Functions *Proceedings of the Western Computer Graphics Symposium,* April 1997, pp. 69–78.

8. Wayne O. Cochran, John C. Hart, Patrick J. Flynn, Fractal Volume Compression, *IEEE Transactions on Visualization and Computer Graphics* 2 (4), December 1996, pp. 313–322.

9. Wayne O. Cochran, John C. Hart, Patrick J. Flynn, Similarity and Affinity Hashing, *Proceedings of the Western Computer Graphics Symposium,* March 1996, pp. 89–100.

10. Wayne O. Cochran, J.C. Hart and P.J. Flynn. Recurrent Modeling. *Intel Forum: Enabling Live Media in Cyberspace,* invited poster. January 1996.

11. Wayne O. Cochran, John C. Hart, Patrick J. Flynn, Principal Component Classification for Fractal Volume Compression, *Proceedings of the Western Computer Graphics Symposium,* March 1995, pp. 9–18.

Graduate Student Advising

- Jason Neufeld, (Current) MS Topic: *Tiling Techniques for Texture Maps.*
- Michael Persons, MS May 2010. *Methods for Generating Wang Tiles.*
- Gunay Uyan, MS December 2005. *Efficient Wang-Tiling and Real Time Rendering of Lambertian Reflectance Maps.*
- Ryan Tindall, MS December 2005. *Graphics Hardware Acceleration of the Finite Difference Time Domain (FDTD) Algorithm.*

Consulting

- Integrated Engineering Solutions, 1610 NE Eastgate Blvd. Suite 440 Pullman, WA 99163, `www.ie-sol.com`.
  Designed and implemented a video stitching algorithm for a stereo panorama camera system. The solution was implemented using NVidia's CUDA parallel computing platform for Telsa GPU-based systems.
- GeoMonkey, Inc, 5512 NE 109th Ct. Ste 101 Vancouver, WA 98662, (360) 718-8120, `www.geomonkey.com`.
  Converted large KML polygonal datasets into a form used for fast multiresolution viewing in Google Maps. Also helped implement the `MapWithUs GIS` iPhone app using Apple's core location technology and Google's map API.
- Smith-Root Inc, 14014 NE Salmon Creek Avenue, Vancouver, WA 98686.
  Helped design and port control software for an electronic fish barrier. The system is now web based, and uses a client/server protocol for remote control.

Professional Service

- Paper Chair for Thirteen Annual *Consortium for Computing Sciences in Colleges* (CCSC) Northwestern Regional Conference 2011. Responsible for collecting all submitted papers, procuring referees, and organizing the paper acceptance committee.

Paper Referee for the following Journals and Conferences:

- ACM SIGGRAPH
- ACM Transactions on Graphics
- IEEE Transactions on Visualization and Computer Graphics
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- Information Processing Letters
- Graphics Interface
- IEEE Visualization
- Shape Modeling International
- International Conference on Cyberworlds

Awards

- Curtis Fellowship, 1994, Washington State University.
- Phi Beta Kappa, 1990, Alpha Chapter, University of Washington.
- Deans List, 1990, University of Washington.
- Golden Key National Honor Society, 1990, University of Washington.

References

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