

William V Baxter III

CONTACT

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EDUCATION

University of North Carolina at Chapel Hill

- Ph.D. in Computer Science, September 2004
(Dissertation on realistic interactive simulation of paint)
- M.S. in Computer Science, December 2000
- Cumulative GPA "4.0" (all H, in H/P/L system)

Yale University, New Haven, CT

- B.S. in E.E., June 1995.
- 3.7 GPA

EXPERIENCE

Google. March 2011 to present
Software Developer <http://google.com>

- [2011–2013] Worked on the initial WebGL-based vector renderer for Google Maps (the renderer in use at <http://maps.google.com>).
- [2014–present] Worked on offline maps and rendering for Google Maps on iOS. Currently tech lead of Google Maps iOS rendering team (4 person team, including me).

Microsoft Corporation. February 2009 to February 2011
Researcher <http://microsoft.com>

Co-developed Project Gustav (<http://research.microsoft.com/projects/gustav>), a realistic, immersive painting system implemented on the GPU. Acted as primary designer and developer of Gustav's 3D brushes, and also contributed heavily to most other parts of the system and the research behind it.

OLM Digital, Inc. January 2005 to February 2009
Senior Researcher <http://www.olm.co.jp>

Full time research position at a major Japanese animation and movie studio. Research topics focused on algorithms to improve the efficiency of creating animation with a traditional hand-drawn look, without sacrificing quality.

UNC-CHAPEL HILL July 1998 to 2004

Current: Research Assistant for GAMMA group, <http://www.cs.unc.edu/~gamma>
Previously: Research Assistant for Walkthrough group <http://www.cs.unc.edu/~walk>

- Dissertation research on realistic interactive simulation of oil painting using physically-based modeling of both brush and paint. Using both GPU and CPU for simulation tasks.
See <http://gamma.cs.unc.edu/dab>, <http://gamma.cs.unc.edu/impasto>
- As member of Walkthrough group through 2002, researched the use of parallel hardware in occlusion culling in combination with levels-of-detail to speed up rendering of massive models.

UNC-CHAPEL HILL Summer 2003
Instructor, COMP 4

Taught a full-credit introductory undergraduate course on computers and computer science to a class of 15 students. Chose materials, planned schedule, prepared and delivered daily lectures, and wrote and graded all homeworks, quizzes, and exams.

TOKYO INSTITUTE OF TECHNOLOGY Summer 2002
NSF Summer Program, Visiting Researcher

Worked with a Japanese host researcher on development of better computer-based simulated artistic media. Specifically researched Kubelka-Munk rendering and several physical and heuristic approaches to simulating a thick, oil-like paint medium.

PIXAR STUDIOS, TOOLS DIVISION Summer 2001

Software Developer Intern <http://www.pixar.com>

Worked in the Studio Tools User Interface group. Researched, designed, implemented, user-tested, and deployed a radial menu interface for Pixar's internal modeling and animation tools.

ACTUALITY SYSTEMS Summer 2000

Software Developer Intern <http://www.actuality-systems.com>

Actuality Systems produced volumetric 3D display hardware.

- Developed and patented efficient algorithms for rasterizing lines in 2D polar and 3D cylindrical coordinates
- Wrote visualizations in OpenGL to display results of 3D line rasterization algorithms and to help demonstrate the unusual coordinate system of the 3D display itself.
- Implemented an initial version of OpenGL support for the 3D display as a custom driver for the GL-compatible MESA graphics library.
- Laid out the design for the rest of the MESA driver to be filled in as other parts of the hardware system were completed.

NUMERICAL DESIGN LIMITED Summer 1999

Software Developer Intern <http://www.ndl.com>

- Designed and implemented an inverse kinematics (IK) animation system for the NetImmerse game engine.
- Helped redesign the NetImmerse animation system to better support arbitrary animation controllers of which the IK controller would become one.
- Wrote all parts of the IK including two separate numerical IK solvers. (C++)
- Wrote IK export support for 3DStudio MAX (2.5 and 3.0) using its SDK, and some support routines in MaxScript to make the IK animator's life easier at export time. (C++, MAX API, MAXScript)

NETWORK ASSOCIATES, INC. February 1998 to June 1998

Software Developer (contract position) <http://www.nai.com>

- Contributed in the effort to create a modern GUI client to serve as the unified front end to NAI's Gauntlet firewall product on both Unix and Windows NT platforms.
- Wrote portions of the GUI and front-end client in Java, C, and C++.

VISIX SOFTWARE, INC. June 12, 1995 to January 1998

Started as Technical Support Engineer, and moved up to Software Engineer.

- Worked on many parts of Visix's cross-platform C/C++ application development framework from Drag-and-Drop support, to internationalization and locale support, to developing a robust and flexible new toolbar widget for the toolkit.

TOSHIBA SYSTEMS/SOFTWARE R&D CENTER, Kawasaki Japan.

Trainee/Intern October 1993 - July 1994

- Collaborated with researchers in a typical Japanese R&D lab.
- Implemented and analyzed an artificial intelligence algorithm for automatic faults diagnosis in component systems.

YALE UNIVERSITY and **UNIVERSITY OF MICHIGAN**

Research Assistant Summer 1992, 1993

- Completed projects based on real-time distributed juggling robot:
- Built vision circuit boards; derived and implemented inverse kinematics (Yale).
- Designed and successfully implemented a parallel-architecture neural network controller on Transputer processors (Michigan).

PUBLICATIONS

- **Baxter and Govindaraju**, "Simple Data-Driven Modeling of Brushes", I3D 2010.
- **Baxter, Barla, and Anjyo**, "N-Way Morphing for 2D Animation", CAVW (Proc. CASA 2009).
- **Baxter, Barla, and Anjyo**, "Compatible Embedding for 2D Shape Animation", IEEE Transactions on Visualization and Computer Graphics, 2009.
- **Baxter, Barla, and Anjyo**, "Rigid Shape Interpolation Using Normal Equations", Proc. Symposium on Non-Photorealistic Animation and Rendering, 2008.
- **Baxter and Anjyo**, "Latent Doodle Space", Comp. Graphics For. (Proc. Eurographics), 2006.
- **Baxter**, "Physically-based Modeling Techniques for Interactive Digital Painting", Ph.D. Dissertation, University of North Carolina at Chapel Hill, defended Sept 3, 2004.
- **Baxter and Lin**, "A Versatile Interactive 3D Brush Model", Proceedings of Pacific Graphics 2004, October 2004. (<http://gamma.cs.unc.edu/brush>)
- **Baxter, Liu, and Lin**, "A Viscous Paint Model For Interactive Applications", Computer Animation and Virtual Worlds Journal, 15(3-4):433-442, July 2004.
- **Baxter, Liu, and Lin**, "A Viscous Paint Model For Interactive Applications", Sketch presented at SIGGRAPH 2004, August 2004.
- **Baxter, Wendt, and Lin**, "IMPaSTo: A Realistic, Interactive Model for Paint", in Proceedings of the Symposium on Non-Photorealistic Animation and Rendering, June 2004, pp. 45-56.
- **Baxter and Lin**, "Haptic Interaction With Fluid Media", in the Proceedings of Graphics Interface 2004, May 2004, pp. 81-88.
- **Baxter**, "A Physically Based Modeling Approach to Interactive Digital Painting", to appear in *Energy, Simulation Training, Ocean Engineering, and Instrumentation, Research Papers of the Link Foundation Fellows*. Ed. Brian Thompson. New York, U. of Rochester Press, 2004.
- **Baxter, Scheib, Lin and Manocha**, "DAB: Interactive Haptic Painting with 3D Virtual Brushes", SIGGRAPH 2001, pp 461-468. (A video also appeared in the Animation Theater).
- **Baxter, Sud, Govindaraju, and Manocha**, "GigaWalk: Interactive Walkthrough of Complex Environments", Proceedings of the 13th Eurographics Workshop on Rendering Techniques, pp. 203-214, June 2002.
- **Baxter and Giovinco**, "Rasterization of Lines in a Cylindrical Voxel Grid", US Patent 6,489,961, issued December 3, 2002. (Patent also issued in Taiwan in 2004)
- **Chu, Baxter, Wei, and Govindaraju**, "Detail-preserving Paint Modeling for 3D Brushes", NPAR 2010.
- **Todo, Anjyo, Baxter, and Igarashi**, "Locally Controllable Stylized Shading", ACM Transactions on Graphics (Proc. SIGGRAPH 2007).
- **Wendt, Baxter, Oguz, and Lin**, "Finite Volume Flow Simulations on Arbitrary Domains", Graphical Models, 69(1), 2007.
- **Anjyo, Wemler, and Baxter**, "Tweakable Light and Shade for Cartoon Animation", Proc. Symposium on Non-Photorealistic Animation and Rendering, 2006
- Sections on paint simulation and brush modeling to appear in upcoming 2nd Edition of *Non-Photorealistic Rendering*, A.K. Peters, Ltd. Bruce **Gooch**, Amy **Gooch**, and Mario **Sousa**, Eds.
- **Lin, Baxter, Scheib, and Wendt**, "Physically Based Virtual Painting", Communications of the ACM, 47(8):40-47, August 2004.
- **Harris, Baxter, Scheuermann, and Lastra**. "Simulation of Cloud Dynamics on Graphics Hardware", Proceedings of Graphics Hardware 2003.
- **Lin, Baxter, Foskey, Otaduy and Scheib**, "Haptic Interaction for Creative Processes with Simulated Media", Proc. of IEEE Conf. on Robotics and Automation, pp 598-604, May 2002.
- **Erikson, Manocha, and Baxter**, "HLODs for Faster Display of Large Static and Dynamic Environments", I3D 2001, March 2001, pp. 111-120.
- Gary **Singh**, "Brushing Into Haptics (About the Cover)", IEEE Computer Graphics & Applications, pp. 4-5, 24(2), May 2004. [Article about the dAb painting system.]

FELLOWSHIPS & ACCOLADES

- Invited Keynote Speaker at KAUST Winter Education Program 2014
- NVIDIA Fellowship, 2003-2004
- Link Foundation Fellowship, 2002-2003
- National Science Foundation Summer Program in Japan, Summer 2002

SKILLS

- **Languages:** C++, C, Objective C, Javascript/ECMAScript, D, NVIDIA Cg, Python, Java, Perl, HTML, Lisp, Scheme, bash scripting.
- **Development Tools and APIs:** Metal, OpenGL, Xcode, Visual Studio, emacs, Numpy/Scipy, Matlab.
- **Software Skills:** 3D graphics, numerical methods, OOP, multi-threaded and parallel programming, cross-platform issues, double-byte character issues, NLS, internationalization.
- **Human Languages:** English (Native), Japanese (Fluent), French (Intermediate).
- **Hobbies:** guitar, mandolin, ukulele, harmonica, singing, songwriting, guitar pedal making, iOS app development (<https://apps.apple.com/us/app/jamdrive/id1426207553>)