Mark Carlson

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Education

Georgia Institute of Technology, Atlanta (1999–2004)
Ph.D. in Computer Science, December 2004
Thesis: "Rigid Melting and Flowing Fluid"
Minor in Numerical Methods

University of Central Florida, Orlando (1993–1998)
B.S. in Computer Science, December 1997
Minor in Creative Writing

Work Experience

Sr Graphics Software Engineer — **Walt Disney Animation Studios, Burbank, CA** (Aug 2006–Present)
• Extended and helped maintain an in house Cloth simulator with a Maya interface.
• Advised effects department on future water sequences.

R&D Programmer — **DNA Productions Inc, Irving, TX** (Jan 2005–May 2006)
• Created a fluid dynamics system for use inside Houdini.
• Used Houdini Developer Kit to write POPs and SOPs interface for FX artists–the interface allows texture information to move with the fluid and includes interaction with meshes and meta balls.
• Worked as an FX artist on several water shots for Ant Bully.

Software Engineer — **Assurance Technology Corporation, Carlisle, MA** (1998–1999)
• Designed and coded an automated test suit for GPS modules using MFC and Win32 C++.
• Wrote a Firewire interface for communication between Windows NT and a JIM+ running VxWorks.
• Wrote automated test suite for HPs Phase Noise personality, various spectrum analyzers, and signal generators.
• Wrote VB Scripts and ActiveX controls for communication between LabVIEW and Excel to run the test suite.

IT Consultant — **Lake Pediatrics,Mt. Dora, FL** (1993–1998)
• Setup and maintained a 13 computer NT4.0 network.

Publications

Kwatra, V., Mordohai, P., Kumar Penta, S., Narain, R., Carlson, M., Pollefeys, M., and Lin, M. "Augmenting Real Video with Physical Simulation." (Under Review)

Kim, T., and Carlson, M. 2007 "A Simple Boiling Module." ACM SIGGRAPH / Eurographics Symposium on Computer Animation.

Narain, R., Kwatra, V., Lee, H., Kim, T., Carlson, M., and Lin, M. 2007 "Feature-Guided Dynamic Texture Synthesis on Continuous Flows." Eurographics Symposium on Rendering.

Wojtan, C., Mucha, P. J., Carlson, M., and Turk, G. 2007 "Animating Corrosion and Erosion." Eurographics Workshop on Natural Phenomena

Kwatra, V., Adalsteinsson, D., Kim, T., Kwatra, N., Carlson, M., and Lin, M. 2007 "Texturing Fluids", IEEE Transactions on Visualization & Computer Graphics

Kwatra, V., Adalsteinsson, D., Kwatra, N., Carlson, M., and Lin, M. 2006 "Texturing Fluids", Technical Sketches Program, ACM SIGGRAPH

Kwatra, N., Wojtan, C., Essa, I., Turk, G., Mucha, P. J., Carlson, M. "Water with Character(s): Fluid Simulation with Articulated Bodies", In Submission.

Nealen, A., Müller, M., Keiser, R., Boxerman, E., Carlson, M. 2005 "Physically Based Deformable Models in Computer Graphics", Eurographics State of the Art Report.

Carlson, M., Mucha, P. J., and Turk, G. 2004. "Rigid Fluid: Animating the Interplay Between Rigid Bodies and Fluid", The Proceedings of ACM SIGGRAPH.

Carlson, M., Mucha, P. J., Van Horn III, R. B., and Turk, G. 2002. "Melting and flowing", In ACM SIGGRAPH Symposium on Computer Animation, 167–174.

Miscellaneous Experience

• Wrote several numerical solvers from scratch including Linear Complementarity (LCP), Preconditioned Conjugate Gradient, ENO, WENO, Forward and Backward Euler, Crank-Nicholson, Locally One Dimensional, Alternating Direction Implicit, SOR, Gauss-Seidel, BFECC, and many Runge-Kutta.

• Implemented Implicit Cloth Solver similar to "Large Steps in Cloth Simulation," Baraff et al., SIGGRAPH 1998

• Implemented Various Cloth Models including: Discrete Shells, Quadratic Bending, Membrane Stretching, and Area Preservation.

• Implemented the rigid body solver in "Nonconvex Rigid Bodies with Stacking," Guendelman et al., Siggraph 2003

• Implemented the particle based fluid solver in "Particle-Based Fluid Simulation for Interactive Applications", Müller et al., Symposium on Computer Animation 2003

• Implemented the hybrid particle level set technique from "Animation and Rendering of Complex Water Surfaces," Enright et al., Siggraph 2002

• Implemented the variable density fluid solver from "Physically Based Modeling and Animation of Fire", Nguyen et al., Siggraph 2002

• Implemented the smoke simulator from "Stable Fluids", Stam, Siggraph 1999

• Implemented many graphics and animation techniques including: Rigid Body Simulators, BSP, Collision Detection, Motion Capture Transitions, Inverse Kinematics, Progressive Meshes, Mesh analysis, L-Systems, Particle systems, human motion controllers, and shape morphing with level sets

• Teaching Assistant for Graduate and Undergrad Computer Graphics, and Animation Classes

• C/C++: Over 11 years experience

• **Experience with:**Houdini, HDK, OpenGL, Glide, DirectX, 3D Studio MAX, ActiveX, MFC, Microsoft Visual Studio, Maya, Visual Basic, Ada95, Scheme, MEL, POV-ray tracer, Adobe After Effects