

E. Scott Larsen

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Education

Ph.D., Computer Science, University of North Carolina at Chapel Hill (August 2006)
M.S., Computer Science, Brigham Young University (2000)
B.S., Computer Science (Minor: Mathematics), Brigham Young University (1998)

Recognitions

NVIDIA Fellowship (2005-2006 academic year)
8 nationwide recipients, from over 200 applicants
Finalist for NVIDIA Fellowship, 2004
President - UNC Computer Science Student Association (2001-2002 academic year)
Representing approximately 150 graduate students, the CSSA President attends, participates in, and casts a faculty vote in the weekly faculty meetings.
Best Student Paper finalist, "Fast Matrix Multiplies using Graphics Hardware," SC2001
3 finalists. "Google Scholar" says **this paper has been cited over 50 times**.
Best in Session Award - BYU Spring Research Conference, 1998
Eagle Scout, 1990

Research and Teaching Interests

- 3D Computer Vision and Graphics using commodity Graphics Processing Units
- Non-Photorealistic Rendering
- Parallel and Distributed Processing
- Scientific and Geometric Visualization

Teaching Experience

Instructor: UNC COMP 136 Introduction to Computer Graphics (Fall 2004)
Taught the undergraduate graphics course (24 students), entirely on my own. Including course syllabus, all lesson plans and development, all assignments, and all testing.
Project gallery at <http://www.cs.unc.edu/~larsene/136/gallery>

Guest Instructor: UNC COMP 290 General Purpose Computation using Graphics Processors (Fall 2004)
Guest instructor for the lecture on Matrix Multiplication on the GPU

Teaching Assistant: BYU CS 455 Computer Graphics (Fall 1999)
Instructor: Robert Burton; Created and graded all assignments; held office hours help for students

Private Tutor: BYU (1996-2000)
Tutored undergraduates in various Computer Science and Mathematics topics

Math Lab Tutor: BYU Mathematics Department (1996-1997)
Tutored up through Calculus and Linear Algebra

Voluntary Full-Time Church Service: (1994-1996)
Unpaid full-time teaching of religious topics in Ohio for 24 months

Research Experience

Doctoral Research: Department of Computer Science, UNC, 2000-2006 (advisor: Professor Henry Fuchs)
- Production of an algorithm for quality reconstruction of office sized environments with multiple video cameras. This algorithm is a modified Belief Propagation algorithm combined with a plane sweeping approach. It is orders of magnitude more efficient than Belief Propagation, and aims to be simpler, scale better, and produce better results.

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Research Experience (continued)

- Production of a hybrid stereo and structured-light algorithm using Belief Propagation for fast reconstructions of office environments.
- Production of modified Belief Propagation algorithms for stereo video taking advantage of temporal coherency.

Masters Research: Hyperspace Research Group, Department of Computer Science, BYU 1997-2000 (advisor: Professor Robert Burton)

- Thesis on a novel method for temporally coherent fully automatic 3D impressionistic rendering.
- Produced an improvement to the greedy algorithm which we prove optimizes a special case of the bin packing problem in a faster complexity order.

Industry Experience

Internship: NVIDIA, under Craig Wittenbrink (Summer 2005)

Created a Multi-engine test for verification of future functionality requiring cooperation of multiple types of engines in the GPU. This required specifying the test and working across many different divisions of the architecture portion of the company. This also required significant changes to the testing infrastructure to enable multiple units to be running together with shared data.

Internship: NVIDIA, under Sebastien Domine (Summer 2004)

Produced Software Development Kit for the Instrumented Driver. This included aiding in specification, design, and implementation. I provided developer-land access to chip- and driver- level counters via graphical user interface, C, C++, PDH, and PIXforWindows. I presented the product to other groups in NVIDIA and also gave Exhibitor Sessions presentations on it at SIGGRAPH.

Internship: Mitsubishi Electric Research Laboratories, under Hanspeter Pfister and Jonathan Yedidia (Summer 2003)

Use of the GPU for novel computer vision algorithms (still NDA)

Internship: NVIDIA, under Dave Morey (Summer 2002)

Explorations into applications of GPU programmability to non-graphics applications (still NDA)

Employee: Orangatango, Inc., under Greg Mockett (January - August 2000)

Orangatango had 5 employees, I was one of two engineers implementing the primary product (a full featured web browser in a web page, with full database backend). I took part in formulating company vision and long term objectives. I was responsible for implementing and managing a project requiring heavy use of Javascript, Perl, and Oracle software.

Computer Systems Administrator: BYU Mathematics Department (1996-1998)

Administered a heterogeneous network consisting of Irix, Solaris, HP-UX, FreeBSD, and Windows computers

Refereed Publications

E. Scott Larsen, "Multiview Belief Propagation for Reconstruction of Office Environments," Doctoral Dissertation, Computer Science Department, University of North Carolina at Chapel Hill, expected August 2006

Naga K. Govindaraju, Scott Larsen, Jim Gray, and Dinesh Manocha, "An Efficient Memory Model for Scientific Algorithms on Graphics Processors," Proceedings of the 2006 ACM/IEEE International Conference on Supercomputing (SC2006), Tampa, FL, November 11-17, 2006

Naga K. Govindaraju, Scott Larsen, Jim Gray, and Dinesh Manocha, "An Efficient Memory Model for Scientific Algorithms on Graphics Processors," UNC Technical Report 2006

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Refereed Publications (continued)

- E. Scott Larsen, Philippos Mordohai, Marc Pollefeys, and Henry Fuchs, "Simplified Belief Propagation for Multiple View Reconstruction," Third International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT), Chapel Hill, NC June 14-16, 2006 (Poster - CD Proceedings)
- Nico Galoppo, Naga Govindaraju, Michael Henson, Vinay Bondhugula, Scott Larsen, and Dinesh Manocha, "Efficient Numerical Algorithms on Graphics Hardware," 2006 Workshop on Edge Computing Using New Commodity Architectures (EDGE), Chapel Hill, NC, May 23-24, 2006 (Poster - CD Proceedings)
- E. Scott Larsen and Robert P. Burton, "Optimizing the Three-Coins Problem in $O(y)$ Instead of $O(T)$ " submitted for publication
- E. Scott Larsen, Jonathan Yedidia, and Hanspeter Pfister, "Multi-Resolution Belief Propagation on the GPU for Phase-Unwrapping," 2004 ACM Workshop on General-Purpose Computer on Graphics Processors, Los Angeles, CA (August 7-8, 2004) (Poster - page C-48 in Proceedings)
- N. Kelshikar, ..., E. Scott Larsen, et. al., "Real-time Terascale Implementation of Tele-immersion," Workshop on Terascale Performance Analysis (ICCS 2003), Melbourne, Australia, June 2003.
- Towles, Herman, ..., E. Scott Larsen, et. al. "Transport and Rendering Challenges of Multi-Stream 3D Tele-Immersion Data," NSF Lake Tahoe Workshop on Collaborative Virtual Reality and Visualization (CVRV 2003), Tahoe City, CA, October 26-28, 2003.
- E. Scott Larsen and David K. McAllister, "Fast Matrix Multiplies using Graphics Hardware," Supercomputing '01: Proceedings of the 2001 ACM/IEEE International Conference on Supercomputing (SC2001), Denver, CO, 2001 - Best Student Paper finalist
- E. Scott Larsen, "BENT: 3D Impressionism - A Graphics System for Impressionistic Environments," Master's Thesis, Computer Science Department, Brigham Young University, 2000

Patents

- Quantifying Graphics Image Difference, with Jeffery Kiel (NVIDIA), patent pending (filed 2004)

Professional Activities

Tutorial "Using the Graphics Processing Unit for Computer Vision," at the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR), June 17-22, 2006, New York, NY

Reviewer for:

IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)

IEEE Visualization (VIS)

IEEE Transactions on Visualization and Computer Graphics (TVCG)

Eurographics Computer Graphics Forum (CGF)

SIGGRAPH/Eurographics Graphics Hardware

European Conference on Computer Vision (ECCV)

Member IEEE/IEEE Computer Society (since 2000)

Member ACM/ACM SIGGRAPH (since 2000)

Attended SIGGRAPH 2002, 2003, 2004, 2005

Attended SuperComputing (SC) 2001, 2003

Attended CVPR 2006

Attended 3DPVT 2006

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References

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