

Peter S. Shirley

July, 2016

Education:

Ph.D., Computer Science, University of Illinois, Urbana, 1991.

B.A., Physics, Reed College, Portland, OR, 1985.

Professional experience:

Distinguished Research Scientist, NVIDIA, 20016 –

CTO, Purity LLC, 2013 - 2016.

Adjunct Professor, Computer Science, Westminster College, 2015.

Principal Research Scientist, NVIDIA, 2008 – 2013.

Adjunct Professor, School of Computing, University of Utah, 2008 – 2014

Professor, School of Computing, University of Utah, 2005 – 2008.

Associate Professor, School of Computing, University of Utah, 1999 – 2005.

Assistant Professor, School of Computing, University of Utah, 1996 – 1999.

Visiting Assistant Professor, Program of Computer Graphics, Cornell University, 1994 – 1996.

Assistant Professor, Computer Science, Indiana University, 1990 – 96.

External Service:

Associate Editor, *Journal of Computer Graphic Techniques*, 2012 – .

Associate Editor, *Foundations and Trends in Computer Graphics and Vision*, 2004 –

Associate Editor, *Journal of Graphics Tools*, 1996 – 2005, 2006 – 2012.

Associate Editor, *ACM Transactions on Graphics*, 2001 – 2005.

Program Committee, Symposium on Applied Perception, 2016.

Program Committee, High Performance Graphics, 2009–2011.

Program Committee, SIGGRAPH Aisa 2008, 2009.

Program Committee, GRAPP 2007.

Program Comittee, AGPV 2006–2007.

Program Comittee, ACM Symposium on Virtual Reality Software and Technology, 2006 – 2007.

Program Committee, SIBGRAPI 2006.

Program Committee, I3D 2005, 2007, 2009, 2010, 2013.

Program Committee, Computer Graphics International, 2005.

Program Committee, IASTED International Conference on Visualization, Imaging and Image Processing, 2005.

Program Committee, SIGGRAPH, 1999, 2001, 2003, 2004.

Program Committee, Eurographics Symposium on Rendering, 1991–98, 2000–05, 2007, 2009–2011, 2016.

Program Committee, Spring Conference on Computer Graphics, 1999, 2001, 2002, 2004–2007.

Program Committee, Symp. on Non-Photorealistic Animation and Rendering, 2002, 2004
Papers Advisory Board, SIGGRAPH 2003.
NSF panels, 1993,1995–2000, 2002.
Co-chair, Dagstuhl Workshop on Monte Carlo Computer Graphics, 2001.
Program Committee, Pacific Graphics, 1997, 1999–2001, 2005.
Speaker, SIGGRAPH Courses, 1992, 1993, 1998, 2001, 2005, 2012.
Jury, SIGGRAPH Film and Video Show, 1999.
Program Committee, Workshop on Rendering, Perception, and Measurement, 1999.
Program Committee, Computer Graphics and Imaging, 1999.
Program Committee, Graphics Interface, 1999.
Program Committee, Parallel Rendering Symposium, 1997.
Program Committee, Volume Visualization Workshop, 1996.
Co-chair, IEEE Symposium on Interactive Ray Tracing, 2006.
Co-chair, Eurographics Rendering Workshop, 1994.

University of Utah service:

School of Computing Curriculum Committee, Chair, 2006–2007.
School of Computing Associate Director, 2005–06.
School of Computing Director of Graduate Studies, 2004–06.
School of Computing Admissions Committee, 1996–98.
School of Computing Honors Advisor, 2000–2007.
School of Computing BS/MS Advisor, 2004–2005.
School of Computing Undergraduate Committee, 2001–2004.
School of Computing Curriculum Committee, 2003–.
School of Computing Comprehensive Exam Committee, 1996–2000.
College of Engineering Teaching Excellence Committee, 2006.
University Credits and Admissions committee, 2002–04.
University Computer Animation Degree Creation Committee, 2004–2007

Indiana University Non-seminar courses:

Rendering Techniques (created course), Fall 1990.
Discrete Math, Spring 1991.
Systems Programming, Fall 1991.
Computer Graphics I (created course), Spring 1992.
Rendering Techniques, Fall 1992.
Computer Graphics I, Spring 1993.
Data Structures, Fall 1993.
Computer Graphics I, Spring 1994.

University of Utah Non-seminar courses:

CS 431/2/3 Computer Graphics full year sequence 1996/97.
CS 684 Advanced Ray Tracing (created course), Spring 1997.

CS 431/2/3 Computer Graphics full year sequence 1997/98.
CS 684 Advanced Ray Tracing, Winter 1998.
CS 5540 Human-Computer Interaction (created course), Fall 1998.
CS 6620 Image Synthesis (created course), Spring 1999.
CS 6960 (Special Topics) Surface Reflection Functions, Fall 1999.
CS 3510 Data Structures, Spring 2000.
CS 3505 Honors Software Engineering (created course), Fall 2001.
CS 6650 Image Synthesis, Fall 2001.
CS 5605 Honors Intro Graphics, (created course) Spring 2002.
CS 6620 Advanced Graphics 2, Spring 2002.
CS 3505 Honors Software Engineering, Fall 2002.
CS 6650 Image Synthesis, Fall 2002.
CS 6620 Advanced Graphics 2, Spring 2003.
CS 2100 Discrete Structures, Spring 2003.
CS 3505 Honors Software Engineering, Fall 2003.
CS 2100 Discrete Structures, Spring 2004.
CS 7650 Realistic Image Synthesis, Summer 2004.
CS 2100 Discrete Structures, Spring 2005.
CS 7650 Realistic Image Synthesis, Summer 2005.
CS 7960 Topics in Ray Tracing, Fall 2005.
CS 2100 Discrete Structures, Spring 2006.
CS 7650 Realistic Image Synthesis, Fall 2006.
CS 5600 Computer Graphics, Spring 2007.
CS 6620 Advanced Graphics 2, Spring 2009.

Westminster College Non-seminar courses:

Introduction to Computer Graphics, Spring 2015.

Awards and Honors:

Phi Beta Kappa

Best Paper Award (one of three), Eurographics 91 Conference.

Best Paper Award, Visualization 98 Conference.

College of Engineering Dean's Teacher Award (one of three), 1998.

University of Utah Student's Choice Teaching Award (one of eight), 2000.

University of Utah Distinguished Teaching Award (one of four), 2005.

Best Paper Award, High Performance Graphics 2010 Conference.

Best Paper Award, I3D 2010 Conference.

Software:

Principal author of several commercial mobile apps/ Principal author of *eon*, a probabilistic ray tracer. Has been used in several universities for dozens of papers and adopted as a *SPEC2000* benchmark. Secondary author of *luna*, an efficient ray tracer written in collaboration with R. Keith Morley.

Research Grants:

Designing Visually Accessible Spaces (Legge PI, collaborative grant with University of Minnesota) NIH 1 R01 EY017835-01 2007–2012: \$2,572,000 (left project in 2008).

Hardware Support for Interactive Ray Tracing (Brunvand PI) NSF 05-41009 2006–2008: \$499,382.

Interactive Ray-Tracing & Photo-Realistic Visualization (Parker PI) Utah Center of Excellence 2005–2007: \$290,000.

Efficient Realistic Image Synthesis. (Shirley PI) NSF 03-06151 2003–2006: \$149,934.

ITR: Graphical Navigation of Earth in Space and Time. (Shirley PI, Thompson co-PI) NSF 03-12479 2003–2006: \$349,830.

ITR: Collaborative Research on the Perceptual Aspects of Locomotion Interfaces. NSF 01-21084 (Shirley co-PI, Thompson PI) 2001–2006: \$1,400,000.

Interactive Ray Tracing for Visualization, NSF 99-78099 (Shirley co-PI, Hansen PI), 1999–2002: \$526,778.

MRI: Acquisition of an Experimental Testbed for Computer Graphics, NSF 99-77218 (Shirley co-PI, Hansen PI), 1999–2002: \$610,631.

Global Illumination: Why Bother? (in collaboration with Cornell Program of Computer Graphics), NSF Graphics and Visualization STC Director's Pool (Shirley PI), 1998–2000: \$60,000.

Realistic Graphics for Natural Scenes (Shirley PI, Thompson, Smits co-PIs.), NSF 97-3185, 1998–2001: \$366,926.

User-Directed Hybrid Deterministic and Monte Carlo Parallel Light Transport Algorithms (Shirley PI, Hansen co-PI), NSF 97-20192, 1997–2000: \$409,730.

Realistic Computer Graphics for Design and Advertising (Shirley PI), Honda Motor Company 1997–98: \$25,000.

Realistic Computer Rendering of Complex Scenes Using Quantitative Perceptual Error Metrics (Shirley PI), NSF 94-0196, 97-96136, 1995–97: \$136,950.

Physically and Perceptually-Based Parallel Global Illumination Solutions (Shirley grant co-author, Greenberg PI), NSF CISE Metacenter Regional Alliance Program, 1995–1997: \$990,000.

An Infrastructure for Conceptualization and Visualization (Shirley co-PI, Wise PI) NSF CISE II 93-03189 1993–97: \$1,250,514.

Advanced Computer Graphics Equipment for Rendering and Visualization (Shirley co-PI, Hanson PI) NSF CISE RI 92-23008 1993–94: \$100,000.

True Virtual Reality Systems (Shirley PI), NSF RIA 92-09457 1992–94: \$55,885.

Invited Talks and Special Courses :

Keynote talk, CSCC Northwestern Conference, November, 2015.

Invited course, SIGGRAPH ASIA, November, 2013.

Invited course, SIGGRAPH ASIA, November, 2012.

Keynote talk, EGSR, June, 2011.

Keynote talk, EGPGV, March, 2009.

Invited talk, MCQMC, August, 2006.

Speaker, SIGGRAPH Interactive Ray Tracing Course, August 2006.

Speaker, SIGGRAPH Interactive Ray Tracing Course, August 2005.

Invited talk, Computer Graphics International, June, 2005.

University of Saarland Special Joint Colloquium (with David Kirk), December, 2004.

Speaker, Disney Feature Animation, September, 2004.

University of Alberta Distinguished Lecture Series, February, 2004.

Speaker, SIGGRAPH State of the Art in Modeling and Measuring of Surface Reflection, 2001.

Speaker, SIGGRAPH State of the Art in Monte Carlo Ray Tracing for Realistic Synthesis Course, 2001.

Speaker, SIGGRAPH A Basic Guide to Global Illumination Course, 1998.

A Practitioners' Assessment of Light Reflection Models, invited talk (with paper), Pacific Graphics 1997.

Speaker, SIGGRAPH Global Illumination in Architecture and Entertainment Course, 1996.

Speaker, SIGGRAPH Advanced Radiosity Course, 1994.

Full-day speaker, Ray Tracing and Radiosity: Fundamental Algorithms of Photorealistic Image Synthesis, 3-day short course offered in *The Berkeley Series in Visual Computing*, Co-instructor, Andrew Glassner, 1991.

Books:

1. G. Sakas and P. Shirley and S. Muller (editors), *Photorealistic Rendering Techniques* 1995. Springer-Verlag. (Proceedings of 1995 Rendering Workshop).
2. P. Shirley, *Realistic Ray Tracing*. 2000. AK Peters.
3. P. Shirley, *Fundamentals of Computer Graphics*. 2002. AK Peters.

4. P. Shirley, R. Morley, *Realistic Ray Tracing, 2nd Ed.* 2003. AK Peters.
5. P. Shirley, *Fundamentals of Computer Graphics, 2nd Ed.* 2005. AK Peters.
6. K. Sung, P. Shirley, S. Baer. *Essentials of Interactive Computer Graphics*, 2008. AK Peters.
7. P. Shirley and S. Marschner, *Fundamentals of Computer Graphics, 3rd Ed.* 2009. AK Peters.
8. S. Marschner and P. Shirley, *Fundamentals of Computer Graphics, 4th Ed.* 2015. Taylor & Francis.
9. P. Shirley, *Ray Tracing in One Weekend* series of three Amazon Kindle books. 2016.

Invited Article:

1. P. Shirley, H. Hu, B. Smits, E. Lafortune, “A Practitioners’ Assessment of Light Reflection Models,” *Pacific Graphics 97*, pp. 40–49.

SIGGRAPH Conference Articles:

1. E. Reinhard, M. Stark, P. Shirley, J. Ferwerda. “Photographic Tone Reproduction for Computer Graphics,” *SIGGRAPH '02*, printed in *ACM Transactions on Graphics*, 21(3), 2002, pp. 267–276.
2. H. Jensen, M. Stark, S. Premoze, F. Durand, J. Dorsey, P. Shirley. “A Physically-Based Night Sky Model,” *SIGGRAPH '01*, pp. 399–408.
3. M. Ashikhmin, S. Premoze, P. Shirley, “A Microfacet-based BRDF Generator,” *SIGGRAPH '00*, pp. 65–74.
4. A. J. Preetham, P. Shirley, B Smits, “A Practical Analytic Model for Daylight,” *SIGGRAPH '99*, pp 91–100.
5. A. Gooch, B. Gooch, P. Shirley, E. Cohen, “A Non-photorealistic Lighting Model for Automatic Technical Illustration,” *SIGGRAPH '98*, pp. 447–452.
6. D. Greenberg, K. Torrance, P. Shirley, J. Arvo, J. Ferwerda, S. Pattanaik, E. Lafortune, B. Walter, S. Foo, “A Framework for Realistic Image Synthesis,” presented at special session at *SIGGRAPH '97*, pp. 477–494.
7. J. Ferwerda, S. Pattanaik, P. Shirley, and D. Greenberg, “A Model of Visual Masking for Computer Graphics,” *SIGGRAPH '97*, pp. 143–152.
8. J. Ferwerda, S. Pattanaik, P. Shirley, D. Greenberg, “An Adaptation Model for Realistic Image Synthesis,” *SIGGRAPH '96*, pp. 249–258.
9. G. Spencer, P. Shirley, K. Zimmerman, D. Greenberg, “Physically-Based Glare Effects for Digital Images,” *SIGGRAPH '95*, pp. 325–334.

Journal Articles:

1. C. Crassin, D. Luebke, M. Mara, M. McGuire, B. Oster, P. Shirley, P. Sloan, C. Wyman, "CloudLight: A System for Amortizing Indirect Lighting in Real-Time Rendering" *Journal of Graphics Techniques*, 2015.
2. C. Wyman, P. Sloan, P. Shirley, "Simple Analytic Approximations to the CIE XYZ Color Matching Functions" *Journal of Graphics Techniques*, 2013.
3. P. Shirley, A. Robison, K. Morley, "An Algorithm for Managing Color in Global Tone Reproduction" *Journal of Graphics Tools*, 2011.
4. M. Bratkova, P. Shirley, W. Thompson, "Expressive Rendering of Mountainous Terrain", *ACM Transactions on Graphics*, 2009.
5. M. Bratkova, S. Boulos, P. Shirley "oRGB: A Practical Opponent Color Space for Computer Graphics", *IEEE Computer Graphics & Applications*, 29(1), 2009.
6. K. Potter, A. Gooch, B. Gooch, P. Shirley, R. Riesenfeld, "Resolution Independent NPR-Style 3D Line Textures" *Computer Graphics Forum*, 2009.
7. I. Wald, S. Boulos, P. Shirley, "Ray tracing deformable scenes using dynamic bounding volume hierarchies", *ACM Transactions on Graphics*, 2007.
8. J. D. Lacewell, D. Edwards, P. Shirley, and W. Thompson, "Stochastic Billboard Clouds for Interactive Foliage Rendering" *Journal of Graphics Tools*, 2006.
9. Dave Edwards, Solomon Boulos, Jared Johnson, Peter Shirley, Michael Ashikhmin, Michael Stark and Chris Wyman *ACM Transactions on Graphics* Volume 25 Issue 1, Jan 2006 The Halfway Vector Disk for BRDF Modeling. pp 1–18.
10. C. Wyman, S. Sparker, P. Shirley, C. Hansen, "Interactive Display of Isosurfaces with Global Illumination", *IEEE Transactions on Visualization and Computer Graphics*, 2006.
11. K. Sung, P. Shirley, "A Top-Down Approach to Teaching Introductory Computer Graphics", *Computers & Graphics*, 2005.
12. M. Stark, P. Shirley, M. Ashikhmin, "Efficient Generation of Stratified Samples for B-Spline Basis Functions", *Journal of Graphics Tools*, 2005.
13. A. Williams, S. Barrus, R. Morley, P. Shirley, "An efficient and robust ray–box intersection algorithm", *Journal of Graphics Tools*, 2005.
14. A. Lefohn, R. Caruso, E. Reinhard, B. Budge, P. Shirley, "An Ocularist's Approach to Human Iris Synthesis", *IEEE Computer Graphics & Applications*, 23(6), 2003.
15. W. Martin, E. Reinhard, P. Shirley, S. Parker, W. Thompson, "Temporally Coherent Interactive Ray Tracing", *Journal of Graphics Tools*, 7(2), 2003, pp. 41–48.
16. J. Kniss, S. Premoze, C. Hansen, P. Shirley, A. McPherson, "A Model for Volume Lighting and Modeling" *IEEE Transactions on Visualization and Computer Graphics*, 9(2), 2003, pp. 150–162.
17. G. Baranoski, J. Rokne, P. Shirley, T. Trondsen, R. Bastos, "Simulating the Aurora", *Journal of Visualization and Computer Animation*, 14(1), 2003, pp. 150–162.

18. M. Ashikhmin, P. Shirley, “Steerable Illumination Textures”, *ACM Transactions on Graphics*, 21(1), 2002, pp. 1–19.
19. C. Madison, W. Thompson, D. Kersten, P. Shirley, B. Smits, “Use of interreflection and shadow for surface contact”, *Perception and Psychophysics*, 2001.
20. E. Reinhard, M. Ashikhmin, B. Gooch, P. Shirley, “Color Transfer between Images”, *IEEE Computer Graphics & Applications*, 21(5), 2001, pp. 34–41.
21. M. Ashikhmin, S. Premoze, P. Shirley, B. Smits, “A Variance Analysis of the Metropolis Light Transport Algorithm”, *Computers & Graphics*, 25(2), 2001, pp. 287–294.
22. M. Ashikhmin, P. Shirley, “An Anisotropic Phong BRDF Model,” *Journal of Graphics Tools*, 5(2), 2000, pp. 25–32.
23. W. Martin, E. Cohen, R. Fish, P. Shirley, “Practical Ray Tracing of Trimmed NURBS Surfaces”, *Journal of Graphics Tools*, 5(1), 2000, pp. 25–32.
24. J. Hollerbach, W. Thompson, P. Shirley, “The Convergence of Robotics, Vision, and Computer Graphics for User Interaction,” *International Journal of Robotics Research*, 1999.
25. S. Parker, M. Parker, Y. Livnat, P. Sloan, C. Hansen, P. Shirley, “Interactive Ray Tracing for Volume Visualization,” *IEEE Transactions on Computer Graphics and Visualization*, 5(3), 1999, pp. 238–250.
26. P. Shirley, K. Chiu, “A Low Distortion Map Between Disk and Square,” *Journal of Graphics Tools*, 2(3), 1998, pp. 45–52.
27. G. Greger, P. Shirley, P. Hubbard D. Greenberg, “The Irradiance Volume,” *IEEE Computer Graphics & Applications*, 1998, pp. 32–43.
28. B. Walter, P. Hubbard, P. Shirley, D. Greenberg, “Global Illumination Using Locally-Linear Density Estimation,” *ACM Transactions on Graphics* 1997, pp. 217–259.
29. P. Shirley, C. Wang, K. and Zimmerman, “Monte Carlo Techniques for Direct Lighting Calculations,” *ACM Transactions on Graphics*, 1996, pp. 1–36.
30. P. Shirley, “Time Complexity of Monte Carlo Radiosity.” *Computers & Graphics* (Award Paper reprint; originally appeared in *Eurographics '91*). 1992, pp. 117–120.
31. D. Hetrick, C. Travis, P. Shirley, E. Etnier, “Model Predictions of Watershed Hydrologic Components: Comparison and Verification,” *Water Resources Bulletin*, 1986, pp. 803–810.

Collections:

1. K Chiu, P. Shirley, C. Wang, “Multi-jittered Sampling,” *Graphics Gems IV*, 1993, pp. 370–374.
2. P. Shirley, “Nonuniform Random Point Sets via Warping,” *Graphics Gems III*, 1992, pp. 80–83.
3. K. Sung and P. Shirley, “Ray Tracing with the BSP Tree,” *Graphics Gems III*, 1992, pp. 271–275.

4. P. Shirley, "Radiosity Via Ray Tracing," *Graphics Gems II*, 1991, pp. 306–310.

Refereed Conferences and Workshops:

1. P. Shirley , T. Aila , J. Cohen , E. Enderton , S. Laine , D. Luebke , M. McGuire, "A local image reconstruction algorithm for stochastic rendering", *ACM I3D*, 2011.
2. E. Enderton, E. Sintorn, P. Shirley, D. Luebke, "Stochastic transparency", *ACM I3D*, 2010.
3. M. McGuire, E. Enderton, P. Shirley, D. Luebke, "Real-Time Stochastic Rasterization on Conventional GPU Architectures", *High Performance Graphics*, 2010.
4. M. Bratkova, W. Thompson, P. Shirley, "Automatic Views of Natural Scenes", *Computational Aesthetics*, 2009.
5. A. Robison, P. Shirley, "Image space gathering", *High Performance Graphics*, 2009.
6. D. Lacewell, B. Burley, S. Boulos, P. Shirley, "Raytracing prefiltered occlusion for aggregate geometry", *IEEE Symposium on Interactive Ray Tracing*, 2008.
7. V. Pegoraro, C. Brownlee, P. Shirley, S. Parker, "Towards interactive global illumination effects via sequential Monte Carlo adaptation", *IEEE Symposium on Interactive Ray Tracing*, 2008.
8. P. Shirley, K. Sung, E. Brunvand, A. Davis, S. Parker, S. Boulos, "Rethinking Graphics and Gaming Courses Because of Fast Ray Tracing", *SIGGRAPH Educator's Conference*, 2007.
9. S. Boulos, D. Edwards, J. D. Lacewell, J. Kniss, J. Kautz, "Packet-based whitted and distribution ray tracing", *Graphics Interface 2007*.
10. R. K. Morley, S. Boulos, J. Johnson, D. Edwards, P. Shirley, M. Ashikhmin, S. Premoze, "Image Synthesis Using Adjoint Photons", *Graphics Interface 2006*.
11. S. Callahan, J. Comba, P. Shirley and C. Silva, "Interactive Rendering of Large Unstructured Grids using Dynamic Level-of-Detail", *Visualization 2005*.
12. C. Wyman, C. Hansen, and P. Shirley, "Interactive Caustics Using Local Precomputed Irradiance", *Proceedings of Pacific Graphics*, pp. 143-151, 2005.
13. K. Sung, and P. Shirley, "Returning Adult Students and Algorithm Analysis", *Proceedings of the Sixth Annual CCSC-NW Conference*, pp. 62–72, 2004.
14. P. Shirley, W. Thompson, S. Curtis, D. Gallup. "Stylized Browsing in Space and Time", *VAST*, 2004.
15. E. Reinhard, P. Shirley, M. Ashikhmin, T. Troscianko, "Second order image statistics in computer graphics", *Symposium on Applied Perception in Graphics and Visualization*, 2004.
16. K. Sung, P. Shirley, "A Top-Down Approach to Teaching Introductory Computer Graphics", *SIGGRAPH Educator's Forum*, 2003, pp. 1–4.
17. S. Premoze, M. Ashikhmin, P. Shirley, "Path Integration for Light Transport in Volumes", *Eurographics Symposium on Rendering*, 2003, pp. 52–61.

18. B. Gooch, G. Coombe, P. Shirley, "Painterly Rendering Using Computer Vision Techniques", *Non-Photorealistic Animation and Rendering*, 2002, pp. 83–90.
19. E. Reinhard, P. Shirley, C. Hansen "Parallel Point Reprojection", *Symposium on Parallel and Large-Data Visualization and Graphics*, 2001.
20. B. Gooch, E. Reinhard, C. Moulding, P. Shirley, "Artistic Composition for Image Creation", *Eurographics Rendering Workshop*, 2001, pp. 83–88.
21. G. Baranoski, A. Rokne, P. Shirley, T. Trondsen, R. Bastos, "Simulating the Aurora Borealis", *Pacific Graphics*, 2000, pp. 2–14.
22. H. Hu, A. Gooch, W. Thompson, B. Smits, J. Rieser, P. Shirley, "Visual Cues for Imminent Object Contact in Realistic Virtual Environments", *Visualization*, 2000, pp. 179–185.
23. B. Smits, P. Shirley, M. Stark, "Ray Tracing Displacement Mapped Triangles", *Eurographics Rendering Workshop*, 2000, pp. 307–318.
24. S. Premoze, W. Thompson, P. Shirley, "Geospecific Rendering of Alpine Terrain," *Eurographics Rendering Workshop*, 1999, pp. 107–118.
25. B. Gooch, P. Sloan, A. Gooch, P. Shirley, R. Riesenfeld, "Interactive Technical Illustration," *Symposium on Interactive 3D Computer Graphics*, 1999, pp. 31–38.
26. S. Parker, W. Martin, P. Sloan, P. Shirley, B. Smits and C. Hansen, "Interactive Ray Tracing," *Symposium on Interactive 3D Computer Graphics*, 1999, pp. 119–126.
27. S. Parker, P. Shirley, Y. Livnat, C. Hansen, P. Sloan, "Interactive Ray Tracing for Isosurface Rendering," *Visualization*, 1998, pp. 233–238.
28. K. Chiu, K. Zimmerman, P. Shirley, "The Light Volume: an Aid for Rendering Complex Scenes," *Eurographics Rendering Workshop*, 1996, pp. 1–10.
29. P. Maciel, P. Shirley, "Interactive Navigation of Large Environments using Textured Clusters," *Proc. ACM Symposium on Interactive Graphics*, 1995, pp. 95–102.
30. D. Zareski, B. Wade, P. Hubbard, P. Shirley, "Efficient Parallel Global Illumination using Density Estimation," *Proc. Parallel Rendering Symposium*, 1995, pp. 47–54.
31. G. Baranoski, R. Bramley, P. Shirley, "Fast Radiosity Solutions For Environments with High Average Reflectance," *Eurographics Rendering Workshop*, 1995, pp. 345–356.
32. P. Shirley, B. Wade, P. Hubbard, D. Zareski, B. Walter, D. Greenberg, "Global Illumination via Density-Estimation Radiosity," *Eurographics Rendering Workshop*, 1995, pp. 219–230.
33. K. Zimmerman, P. Shirley, "A Two-Pass Realistic Image Synthesis Method for Complex Scenes," *Eurographics Rendering Workshop*, 1995, pp. 284–295.
34. K. Chiu, P. Shirley, "Rendering, Perception, and Complexity," *Eurographics Rendering Workshop*, 1994, pp. 13–24.

35. K. Chiu, M. Herf, P. Shirley, S. Swamy, C. Wang, K. Zimmerman, "Spatially Nonuniform Scaling Functions for High Contrast Images," *Graphics Interface '93*, pp. 245–253.
36. P. Shirley, C. Wang, "Distribution Ray Tracing: Theory and Practice," *Eurographics Rendering Workshop*, 1992, pp. 33–43.
37. P. Shirley, "Discrepancy as a Quality Measure for Sampling Distributions," *Eurographics Conference*, 1991, pp. 183–194.
38. P. Shirley, K. Sung, W. Brown, "A Ray Tracing Framework for Global Illumination", *Graphics Interface*, 1991, pp. 117–128.
39. P. Shirley, "A Ray Tracing Method for Illumination Calculation in Diffuse-Specular Scenes", *Graphics Interface*, 1990, pp. 205-212.
40. P. Shirley, A. Tuchman, "A Polygonal Approximation to Direct Scalar Volume Rendering", *Volume Visualization Workshop*, 1990, pp. 63–70.
41. P. Shirley, "Physically-Based Lighting Calculations for Computer Graphics: A Modern Perspective," *Eurographics Rendering Workshop*, 1990, pp. 67-81.
42. P. Shirley, H. Neeman, "Volume Visualization at the Center for Supercomputing Research and Development," *Volume Visualization Workshop*, 1989, pp. 17–20.

Former Graduate Students and Post-doctoral Assistants:

Changyaw Wang (Ph.D., Indiana University, 1993)
 Paulo Maciel (Ph.D., Indiana University, 1995)
 Kurt Zimmerman (Ph.D., Indiana University, 1998)
 Amy Gooch (Co-advised with Elaine Cohen, M.S., University of Utah, 1998)
 Arcot Preetham (M.S., University of Utah, 1999)
 Brian Smits (Post-doc, University of Utah, 1997–99).
 Michael Ashikhmin (Ph.D., University of Utah, 2001)
 Erik Reinhard, (Co-supervised with Chuck Hansen, Post-doc, University of Utah, 2001–03).
 Kristi Potter (Co-advised with Rich Riesenfeld, M.S., University of Utah, 2003)
 Helen Hu (Co-advised with William Thompson, Ph.D., University of Utah, 2003)
 Simon Premoze (Ph.D., University of Utah, 2003)
 Chris Wyman (unofficial co-advisor, Ph.D., University of Utah, 2004)
 Solomon Boulos (M.S., University of Utah, 2007)
 Austin Robison (M.S., University of Utah, 2008)
 David Edwards (Ph.D., University of Utah, 2008)
 John Meier (M.S., University of Utah, 2009) Margarita Bratkova Ph.D., University of Utah, 2009.(Co-advised with William Thompson, Ph.D.)

Former Undergraduate Thesis Advisees

Jeremy King (B.S., University of Utah, 2002)
Brian Budge (B.S., University of Utah, 2003)
R. Keith Morley (B.S., University of Utah, 2004)
Claurissa Tuttle (B.S., University of Utah, 2004)
Deb Ghosh (B.S., University of Utah, 2004)
Jared Johnson (B.S., University of Utah, 2005)
David Gallup (B.S., University of Utah, 2005)