Steven G. Parker

Vita
As of September 5^{th}, 2005

Personal Information

Name:	Steven G. Parker
Address:	Scientific Computing and Imaging Institute
	School of Computing
	50 S. Central Campus Dr, Room 3490
	University of Utah
	Salt Lake City, UT 84112
Email:	sparker@cs.utah.edu
Phone:	(801) 585-1504
Place of Birth:	Ft. Benning, Georgia
Date of Birth:	July 25, 1968

Education

B.S.	1992	University of Oklahoma	Electrical Engineering
Ph.D.	1999	University of Utah, Salt Lake City	Computer Science

Professional Employment

Date	Position	Institution
2000–present	Research Assistant Professor	University of Utah
1997–2000	Computer Professional	University of Utah
1994–97	DOE Computational Science Graduate Fellow	University of Utah
1993–94	Research Assistant	University of Utah
1992–93	Teaching Assistant	University of Utah

Scholarship

Publications — Book chapters

1. L.C. McInnes, B.A. Allan, R. Armstrong, S.J. Benson, D.E. Bernholdt, T.L. Dahlgren, L.F. Diachin, M. Krishnan, J.A. Kohl, J.W. Larson, S. Lefantzi, J. Nieplocha, B. Norris, S.G. Parker J. Ray, and S. Zhou, "Parallel PDE-Based Simulations Using the Common Component Architecture," Argonne National Laboratory preprint ANL/MCS-P1179-0704, to appear in the book Numerical Solution of Partial Differential Equations on Parallel Computers, A. M. Bruaset, P. Bjorstad, and A. Tveito, editors, Springer, 2005 (accepted).

2. D.M. Weinstein, S.G. Parker, J. Simpson, K. Zimmerman, G. Jones. "Visualization in the SCIRun Problem-Solving Environment, In The Visualization Handbook", Edited by C.D. Hansen and C.R. Johnson, Elsevier, pp. 615–632. 2005. ISBN: 0-12-387582-X

3. S. Parker, K. Zhang, K. Damevski, C. Johnson, "Integrating Component-Based Scientific Computing Software," In Frontiers of Parallel Processing For Scientific Computing , Edited by M.A. Heroux, P. Raghavan, and H.D. Simon, 2005 (accepted).

4. S. Parker. Interactive Ray Tracing on a Supercomputer. In *Practical Parallel Rendering*, Alan Chalmers and Erik Reinhard, editors, 2002.

5. Y. Livnat, S. Parker, and C.R. Johnson. Fast isosurface extraction methods for large imaging datasets. In *Handbook of Medical Image Processing*, Isaac Bankman, Editor-in-chief, 22 pages, 2000.

6. S.G. Parker, D.M. Weinstein, and C.R. Johnson. "The SCIRun computational steering software system," *Modern Software Tools in Scientific Computing*, edited by E. Arge, A. M. Bruaset and H. P. Langtangen, Birkhauser Press, pp. 1-44, 1997.

Publications — Refereed Journals

7. D. DeMarle, C. Gribble, S. Boulos, and S. Parker. "Memory Sharing for Interactive Ray Tracing on Clusters." *Journal of Parallel Computing*, 2005 (to appear).

8. R. Armstrong, G. Kumfert, L. McInnes, S. Parker, B. Allan, M. Sottile, T. Epperly, and T. Dahlgren. "The CCA Component Model for High-Performance Scientific Computing," *Concurrency and Computation: Practice and Experience*, 2005 (submittted for publication).

9. C.R. Johnson, R.S. MacLeod, S.G. Parker, D.M. Weinstein. "Biomedical Computing and Visualization Software Environments," In Comm. ACM, Vol. 47, No. 11, pp. 64–71. 2004.

10. J. D. de St. Germain, A. Morris, S. G. Parker, A. D. Malony, and S. Shende. "Integrating Performance Analysis in the Uintah Software Development Cycle." *International Journal of Parallel Programming*, 31(1):35–53 (2003).

11. M. Cole and S. Parker. "Dynamic Compilation of C++ Template Code." *Journal of Scientific Programming*, Volume 11, Number 4, 2003.

12. W. Martin, E. Reinhard, P. Shirley, S. Parker, W. Thompson. "Temporally Coherent Interactive Ray Tracing," *Journal of Graphics Tools*, 2003.

13. C.R. Johnson, S.G. Parker, D.M. Weinstein, and S. Heffernan. "Component-Based Problem Solving Environments for Large-Scale Scientific Computing," Concurrency and Computation: Practice and Experience, 14:1337–1349 (2002).

14. K. Ma and S. Parker "Massively Parallel Software Rendering for Visualizing Large-Scale Data Sets." In *IEEE Computer Graphics and Applications*, 2001.

15. C. Johnson, S. Parker, C. Hansen, G. Kindlmann, and Y. Livnat. "Interactive Simulation and Visualization," *IEEE Computer*, December 1999.

16. S. Parker, M. Parker, Y. Livnat, P.-P. Sloan, C. Hansen and P. Shirley. "Interactive Ray Tracing for Volume Visualization," *IEEE Transactions on Visualization and Computer Graphics*, July-September 1999.

17. S.G. Parker, D. Beazley, and C.R. Johnson. "Computational steering software systems and strategies." *IEEE Computational Science and Engineering*, 1997.

Publications — Refereed Conferences

18. M. Cole, F.B. Sachse, D.M. Weinstein, S.G. Parker, R.M. Kirby. "A Software Framework for Solving Problems of Bioelectricity Applying High-Order Finite Elements," In *Proceedings of the IEEE Engineering in Medicine and Biology Society 26th Annual International Conference*, 2004.

19. Kostadin Damevski, Steven Parker. "Imprecise Exceptions in Distributed Parallel Components," In *Proceedings of the 10th International Euro-Par Conference, Lecture Notes in Computer Science*, Vol. 3149, pp. 108–116. August/September, 2004.

20. D.E. DeMarle, C.P. Gribble, S.G. Parker. "Memory-Savvy Distributed Interactive Ray Tracing," *In Eurographics Symposium on Parallel Graphics and Visualization*, Edited by Dirk Bartz, Bruno Raffin and Han-Wei Shen, 2004.

21. R.S. Macleod, D.M. Weinstein, J.D. de St. Germain, D.H. Brooks, C.R. Johnson, S.G. Parker. "SCIRun/BioPSE: Integrated Problem Solving Environment for Bioelectric Field Problems and Visualization," In Proceedings of the Int. Symp. on Biomed. Imag., Arlington, Va, pp. 640–643. April, 2004.

22. K. Zhang, K. Damevski, V. Venkatachalapathy, and S. Parker. "SCIRun2: A CCA Framework for High Performance Computing," *Proceedings of the 9th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS 2004)*, 2004.

23. D. Demarle, S. Parker, M. Hartner, C. Gribble, and C. Hansen. "Distributed Interactive Ray Tracing for Large Volume Visualization," *IEEE Symposium on Parallel Visualization and Graphics*, 2003.

24. K. Damevski, and S. Parker. "Parallel Remote Method Invocation and M-by-N Data Redistribution," *Proceedings of the 4th Los Alamos Computer Science Institute Symposium*, 2003.

25. J. D. de St. Germain, A. Morris, S. G. Parker, A. D. Malony, and S. Shende. "Integrating Performance Analysis in the Uintah Software Development Cycle." *International Symposium on High Performance Computing (ISHPC-IV)*, May 15-17 2002.

26. S.G. Parker "A Component-based Architecture for Parallel Multi-Physics PDE Simulation." *International Conference on Computational Science (ICCS2002) Workshop on PDE Software*, April 21-24, 2002.

27. E. Reinhard, C. Hansen, S. Parker. "Interactive Ray Tracing of Time Varying Data." *EUROGRAPHICS Workshop on Parallel Graphics and Visualization 2002*, September 2002.

28. M. Cole and S. Parker. "Dynamic Compilation of C++ Template Code." *Fourth Workshop on Parallel/High-Performance Object-oriented Scientific Computing (POOSC'01) at the ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA'01)*, 9 pages, October 2001.

29. J. McCorquodale, D. de St. Germain, S. Parker, and C.R. Johnson. "The Uintah Parallelism Infrastructure: A Performance Evaluation on the SGI Origin 2000.," In High Performance Computing 2001, Seattle, March 2001.

30. C. Johnson, S. Parker, and D. Weinstein. "Large-Scale Computational Science Applications Using the SCIRun Problem Solving Environment", 19 pages, in Supercomputer 2000.

31. J. Davison de St. Germain, J. McCorquodale, S. G. Parker, C. R. Johnson. "Uintah: A Massively Parallel Problem Solving Environment". *HPDC'00: Ninth IEEE International Symposium on High Performance and Distributed Computing*, 9 pages, August 2000.

32. R. Rawat, S. Parker, P. Smith, C. Johnson. "Parallelization and integration of fire simulations in the Uintah PSE." *Proceedings of the Tenth SIAM Conference on Parallel Processing for Scientific Computing*, Portsmouth, Virginia, March 12-14, 2001.

33. Y. Livnat, C. D. Hansen, S. G. Parker, and C. R. Johnson. "Isosurface extraction for large-scale data sets." *In Proceedings of Scientific Visualization - Dagstuhl 2000*, Frits Post, ed., 12 pages, 2000.

34. S. G. Parker, M. Miller, C. D. Hansen, and C. R. Johnson. "Computational Steering and the SCIRun Integrated Problem Solving Environment." In *Proceedings of Scientific Visualization - Dagstuhl 2000*, Hans Hagen, ed., pp. 267-276, 2000.

35. R. Armstrong, D. Gannon, A. Geist, K. Keahey, S. Kohn, L. McInnes, S. Parker, and B. Smolinski. "Toward a Common Component Architecture for High-Performance Scientific Computing." *Proceedings of High Performance Distributed Computing (HPDC) 99*, 1999.

36. S. Parker, P. Shirley, Y. Livnat, C. Hansen, P.-P. Sloan, and M. Parker. "Interacting with Gigabyte Volume Datasets on the Origin 2000." The 41^{st} Annual Cray User's Group Conference', 1999.

37. S. Parker, W. Martin, P.-P. Sloan, P. Shirley, B. Smits, and C. Hansen. "Interactive Ray Tracing." *Symposium on Interactive 3D Computer Graphics*, 1999.

38. B. Walter, G. Drettakis and S. Parker, "Interactive Rendering Using the Render Cache." *Proceedings of the* 10^{th} *Eurographics Workshop on Rendering*, 1999.

39. S.G. Parker, P. Shirley, Y. Livnat, C. Hansen, and P. Sloan "Interactive Ray Tracing for Isosurface Rendering." *IEEE Visualization '98*, 1998.

40. S.G. Parker, M. Miller, C.D. Hansen, and C.R. Johnson. "An Integrated Problem Solving Environment: the SCIRun Computational Steering System." 31^{st} *Hawaii International Conference on System Sciences (HICSS-31)*, 1998.

41. C.R. Johnson and S.G. Parker. "Applications in computational medicine using SCIRun: A computational steering programming environment." *Supercomputer 1995*, H.W. Meuer, ed., pp. 2-19, Saur-Verlag, 1995.

42. S.G. Parker and C.R. Johnson. "SCIRun: A scientific programming environment for computational steering." *Supercomputing '95*, IEEE Press, 1995.

43. C.R. Johnson and S.G. Parker. "A Computational Steering Model for Problems in Medicine." *Supercomputing '94*, pp. 540-549, IEEE Press, 1994.

44. D.M. Weinstein, S.G. Parker, and C.R. Johnson. "A physically based mesh generation algorithm: applications in computational medicine." *IEEE Engineering in Medicine and Biology Society* 16^{th} *Annual International Conference*, IEEE Press, 1994.

Publications — Extended Abstracts and Short Papers

45. S.G. Parker and J.D. de St. Germain, "Software Integration in an Academic Environment", presentation at DOE Software Quality Forum, 2003.

46. D. Weinstein, L. Zhukov, C. Johnson, S. Parker, R. Van Uitert, R. MacLeod, and C. Hansen. Interactive Source Imaging with BioPSE, Chicago 2000 World Congress on Medical Physics and Biomedical Engineering, Chicago, IL., July 2000.

47. C. Johnson and S. Parker. The SCIRun parallel scientific computing problem solving environment, extended abstract, *Ninth SIAM Conference on Parallel Processing for Scientific Computing*, 2 pages, 1999.

48. C. Hansen, T. Udeshi, S. Parker, and P. Shirley. "Parallel methods for isosurface visualization," extended abstract, *Ninth SIAM Conference on Parallel Processing for Scientific Computing*, 1999.

49. C. Johnson and S. Parker. "The SCIRun parallel scientific computing problem solving environment", extended abstract, *Ninth SIAM Conference on Parallel Processing for Scientific Computing*, 1999.

50. S.G. Parker and C.R. Johnson. "SCIRun: Applying interactive computer graphics to scientific problems." *SIGGRAPH 96 visual proceedings*, 1996.

Publications — Technical Reports

51. C. Gribble, S.G. Parker, and C. Hansen. “Interactive Volume Rendering of Large Datasets Using the Silicon Graphics Onyx4 Visualization System,” No. UUCS-04-003, University of Utah School of Computing, January 27th, 2004.

52. C.P. Gribble and S.G. Parker. “A Survey of the Itanium Architecture from a Programmer’s Perspective,” SCI Institute Technical Report, No. UUSCI-2003-003, University of Utah, August, 2003.

53. B. Martin, S. Parker, P. Shirley and W. Thompson, “Temporally Coherent Interactive Ray Tracing”, University of Utah tech report UUCS-01-005, May 2001.

54. S.G. Parker, D.M. Weinstein, and C.R. Johnson. “A morphing algorithm for generating near optimal grids: Applications in computational medicine.” University of Utah Technical Report, UUCS-94-014, 1994.

55. S.G. Parker and C.R. Johnson. “Interactive manipulation of contour data using the Layers program - user guide. University of Utah Technical Report,” UUCS-94-020, 1994.

Educational and Popular Articles

56. S.G. Parker. C-SAFE Uses Linux HPCC in Fire Research *Syllabus, Technology for Higher Education*, **vol. 16**, no. 7, Feburary 2003, 2 pages.

57. C.R. Johnson and S.G. Parker. The SCIRun Problem Solving Environment: Applications in Computational Medicine, *SGI Graphics World*, **vol. 9**, no. 9, September, 1999.

58. C.R. Johnson and S.G. Parker. The SCIRun Problem Solving Environment: Applications in Computational Medicine, *HPC Contributions to Society*, 1999.

59. C.R. Johnson, D. McAllister, P.P. Sloan, and S. Parker. Computer Graphics. *MicroSoft Encarta CD ROM*, 1997.

Images and Videos

60. C.R. Johnson and S.G. Parker. Slides and Videos. *Permanent Research Archives*, Smithsonian Museum of American History, 1998.

Thesis

61. S.G. Parker. “The SCIRun Problem Solving Environment and Computational Steering Software System”, *PhD Thesis*, 1999.

Honors and Awards

- Computer World Honors medal, 2003.
- Awarded Best Paper for “Interactive Ray Tracing for Isosurface Rendering” at IEEE Visualization ’98.
- Finalist for 1998 Computer World/Smithsonian Award in the science category for SCIRun.
- Department of Energy Computational Science Graduate Fellowship, Awarded September 1994 to June 1998.

Research Interests

Problems in Computational Science:

- High Performance Computing
- Component Architectures
- Interactive Raytracing
- Computational Steering
- Scientific Visualization
- Computer Graphics
- Problem Solving Environments
- Parallel Programming
- Visual Programming

Professional Activities

Teaching

Co-Teaching CS7960 (Special Topics in Raytracing) Fall 2005.

Taught CS6620 (Advanced Computer Graphics II) Spring 2005.

Co-taught CS5210/6210 (Scientific Computing) Fall 2001.

Co-taught the course “Interactive Ray Tracing” at Siggraph 2001.

Co-taught the course “Systems Designs for Visualizing Large-Scale Scientific Data” at Siggraph 1999.

As a Graduate Student, I was a teaching assistant for Computer Science 364, 365 and 366. I conducted lab sessions, graded homework and tests, and assisted in the preparation of test problems. At the end of the year, I was honored to be nominated by the department for the College of Engineering Outstanding Teaching Assistant Award.

Paper Reviews

- IEEE Transactions on Information Technology in Biomedicine 2005
- ACM SIGMOD 2005
- ACM Siggraph 2005
- IEEE Transactions on Visualization and Computer Graphics 2004
- 19th International Parallel and Distributed Processing Symposium 2004
- IEEE Computer Graphics and Applications 2004
- IEEE Symposium on Volume Visualization 2004
- IASTED International Conference on Computer Graphics and Imaging 2004
- Eurographics Symposium on Rendering 2004
- Supercomputing 2004
- ACM Siggraph 2004
- Elsevier Neuroimage 2004
- International Workshop on High-Level Parallel Programming Models and Supportive Environments 2004

- Elseivier Neuroimage 2003
- Supercomputing 2003
- ACM Siggraph 2003
- Eurographics 2003
- Journal of Parallel and Distributed Computing 2003
- IEEE Visualization 2003
- ACM Transactions on Graphics 2003
- Computers and Industrial Engineering 2002
- IEEE Computer Graphics and Applications 2002
- Eurographics Rendering Workshop 2002
- Concurrency and Computation:Practice and Experience 2002
- IEEE Transactions on Parallel and Distributed Systems 2002
- ACM Siggraph 2002
- ACM Crossroads 2001
- ACM Siggraph 2001
- Advances in Water Resources Journal 2001
- International Parallel and Distributed Processing Symposium 2000
- ACM Symposium on Interactive 3D Graphics 2000
- IEEE Visualization 1999
- ACM Siggraph 1999
- ACM/IEEE Supercomputing 1999
- Principles and Practice of Parallel Programming 1999
- IEEE Visualization 1998
- ACM Siggraph 1998
- IEEE Parallel Rendering Symposium 1997
- IEEE International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS ́97)
- ACM Siggraph 1996

Research Grants and Contracts

Current Support

Supporting Agency:	Department of Energy
Total Costs:	$1,071,971
Title of Project:	Center for Component Technology for Terascale Simulation Software
Duration:	5 years
Start Date:	15 August 2001
Principal Investigators:	Steven Parker (PI)

Supporting Agency:	Department of Energy
Total Costs:	approx. $20,000,000
Responsible Portion:	approx. $4,000,000
Title of Project:	Center for Simulation of Accidental Fires and Explosions
Duration:	5 years
Start Date:	30 September 2002
Principal Investigators:	David Pershing (PI), Chuck Wight (Co-PI) Greg Voth (Co-PI), Phil Smith (Co-PI), Pat McMurtry (Co-PI), Steven Parker (Co-PI)

Supporting Agency:	Department of Energy
Total Costs:	$391,824
Title of Project:	Scientific Data Management Center
Duration:	2 years
Start Date:	15 September 2004
Principal Investigators:	Steven Parker (PI)

Supporting Agency:	State of Utah
Total Costs:	$142,000
Title of Project:	Center for Interactive Ray-Tracing and Photo-Realistic Visualization
Duration:	1 year
Start Date:	1 July 2005
Principal Investigators:	Steven Parker (PI)

Past Support

Supporting Agency:	National Science Foundation
Total Costs:	$443,400
Title of Project:	ITR/SY: Data Parallel Component Software Components
Duration:	3 years
Start Date:	7 August 2001
Principal Investigators:	Steven Parker (PI)

Supporting Agency:	Silicon Graphics, Inc.
Total Costs:	$21,000
Title of Project:	Prism Application Porting
Duration:	6 months
Start Date:	1 February 2005
Principal Investigators:	Steven Parker (PI)

Supporting Agency:	Department of Energy
Total Costs:	$750,000
Title of Project:	Utah Advanced Visualization Technology Center
Duration:	3 years
Start Date:	1 August 2001
Principal Investigators:	Christopher R. Johnson (PI), Chuck Hansen (Co-PI), and Steven Parker (Co-PI)

Supporting Agency:	Visual Influence
Total Costs:	$15,361
Title of Project:	Isosurface Extraction/Flythrough
Duration:	1 year
Start Date:	1 Jan. 1999
Principal Investigators:	Christopher R. Johnson (PI) and Steven Parker

Supporting Agency:	Department of Energy
Total Costs:	$98,000
Title of Project:	Parallel Time-dependent Visualization”
Duration:	1 year
Start Date:	1 August 2001
Principal Investigators:	Chuck Hansen (PI) and Steven Parker

Professional Service

Program Committee of the 14th International Symposium on High Performance Distributed Computing (HPDC-14) 2005.

Program Committee of Challenges of Large Applications in Distributed Environments (CLADE) 2005.

Board of Directors Member, Clark Planetarium 2003–.

International Program Committee of the Seventh IASTED Conference on Computer Graphics and Imaging (CGIM) 2004.

Technical Papers Committee, Supercomputing 2004.

Program Committee of the 9th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS 2004).

Program Committee of the Eighth ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP '01).

Active Member of the DOE Common Component Architecture Forum (CCA).

Moderator, National Conference on Undergraduate Research, 2003.

Professional Societies

- Member of ACM and ACM Siggraph
- Member of IEEE and IEEE Computer Society

Academic Committees

Graduate Admissions Committee 2003–present. Industrial Liason Committee 2003–present.

PhD Students

Kostadin Damevski

Christiaan Gribble

Thiago Ize

Andrew Kensler

Vincent Pegoraro

Abraham Stephens

Keming Zhang

MS Students

Oscar Barney

Graduated Students

Kosta Damevski, MS, Utah, 2003 "Parallel Component Interaction with an Interface Definition Language Compiler"

David Demarle, MS, Utah, 2003 "Distributed Interactive Ray-tracing for Large Volume Visualization"