

Contact Information

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Research Interests

Scientific visualization, high performance computing, large data visualization, parallel visualization algorithms, visualization software frameworks, computer graphics

Education

- Ph.D. in Computer Science, University of California at Davis, Dec. 2006. Advisor: Nelson Max.
- B.S. in Computer Science / Mathematics, University of California at Davis, April 1999.

Professional Experience

- University of Oregon, Computer and Information Science Department, March 2013-present
 - Associate Professor, August 2015-present
 - Assistant Professor, March 2013-August 2015
- Lawrence Berkeley National Laboratory, June 2009-December 2016
 - Staff Scientist, November 2014-December 2016
 - Computer Systems Engineer, June 2009-November 2014
- University of California at Davis, Professional Researcher, June 2009-March 2013
- Lawrence Livermore National Laboratory, Computer Scientist, May 1999-May 2009

Awards

- CIS Department Award for Best Teacher (selected by students) in 2015, 2016, and 2017.
- University of Oregon Research Excellence Award: Outstanding Early Career. One of two awards campus-wide in 2015.
- Department of Energy Early Career Award for “Data Exploration at the Exascale.” Award rate of 8% (68/850) in 2012.
- R&D 100 Award for the VisIt visualization and analysis software, 2005. Fellow awardees were Eric Brugger, Sean Ahern, Kathleen Bonnell, Linnea Cook, Jeremy Meredith, Mark Miller, and Brad Whitlock.
- Best Paper Awards (5) and Best Paper Finalists (1)
 - Best Paper Finalist: “Performance Modeling of In Situ Rendering.” At the International Conference for High Performance Computing, Networking, Storage and Analysis (SC) 2016.
 - Best Paper Award (one of three): “Exploring Visualization Designs Using Phylogenetic Trees.” At the SPIE Conference on Visualization and Data Analysis (VDA) 2015.
 - Best Paper Award: “Improved Post Hoc Flow Analysis Via Lagrangian Representations.” At the IEEE Symposium on Large Data Visualization and Analysis (LDAV) 2014.
 - Best Paper Award: “Dynamic Scheduling for Large-Scale Distributed-Memory Ray Tracing.” At the EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV) 2012.
 - Best Paper Award (one of two): “MPI-hybrid Parallelism for Volume Rendering on Large, Multi-core Systems.” At the EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV) 2010.
 - Best Paper Award: “Beyond Meat Grinders: An Analysis Framework Addressing the Scale and Complexity of Large Data Sets.” At the SpringSim High Performance Computing Symposium 2006.

Peer-Reviewed Journal Articles

1. J. Kress, R. M. Churchill, S. Klasky, M. Kim, H. Childs, and D. Pugmire. Preparing for In Situ Processing on Upcoming Leading-edge Supercomputers. *Supercomputing Frontiers and Innovations*, 3(4):49–65, Dec. 2016.
2. A. C. Bauer, H. Abbasi, J. Ahrens, H. Childs, B. Geveci, S. Klasky, K. Moreland, P. O’Leary, V. Vishwanath, B. Whitlock, and E. W. Bethel. In Situ Methods, Infrastructures, and Applications on High Performance Computing Platforms. *Computer Graphics Forum*, 35(3):577–597, June 2016.
3. K. Moreland, C. Sewell, W. Usher, L. Lo, J. Meredith, D. Pugmire, J. Kress, H. Schroots, K.-L. Ma, H. Childs, M. Larsen, C.-M. Chen, R. Maynard, and B. Geveci. VTK-m: Accelerating the Visualization Toolkit for Massively Threaded Architectures. *IEEE Computer Graphics and Applications (CG&A)*, 36(3):48–58, May/June 2016.
4. H. Childs. Data Exploration at the Exascale. *Supercomputing Frontiers and Innovations*, 2(3):5–13, Dec. 2015.
5. K. Moreland, M. Larsen, and H. Childs. Visualization for Exascale: Portable Performance is Critical. *Supercomputing Frontiers and Innovations*, 2(3):67–75, Dec. 2015.
6. P. Navrátil, H. Childs, D. Fussell, and C. Lin. Exploring the Spectrum of Dynamic Scheduling Algorithms for Scalable Distributed-Memory Ray Tracing. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 20(6):893–906, June 2014.
7. H. Krishnan, J. Meyer, A. Romosan, H. Childs, and W. Bethel. Enabling Advanced Environmental Management via Remote and Distributed Visual Data Exploration and Analysis. *Journal of Computing and Visualization in Science (CAVS)*, 15(3):123–133, Spring 2014.
8. L. Pratt, I. Rypina, T. Özgökmen, P. Wang, H. Childs, and Y. Bebieva. Chaotic Advection in a Steady, Three-Dimensional, Ekman-Driven Eddy. *Journal of Fluid Mechanics*, 738:143–183, Jan. 2014.
9. L. Gosink, K. Bensema, T. Pulsipher, H. Obermaier, M. Henry, H. Childs, and K. I. Joy. Characterizing and Visualizing Predictive Uncertainty in Numerical Ensembles Through Bayesian Model Averaging. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 19(12):2703–2712, Dec. 2013.
10. D. N. Williams, T. Bremer, C. Doutriaux, J. Patchett, S. Williams, G. Shipman, R. Miller, D. R. Pugmire, B. Smith, C. Steed, E. W. Bethel, H. Childs, H. Krishnan, P. Prabhat, M. Wehner, C. T. Silva, E. Santos, D. Koop, T. Ellqvist, J. Poco, B. Geveci, A. Chaudhary, A. Bauer, A. Pletzer, D. Kindig, G. L. Potter, and T. P. Maxwell. Ultrascale Visualization of Climate Data. *IEEE Computer*, 46(9):68–76, Sept. 2013.
11. H. Childs, B. Geveci, W. Schroeder, J. Meredith, K. Moreland, C. Sewell, T. Kuhlen, and E. W. Bethel. Research Challenges for Visualization Software. *IEEE Computer*, 46(5):34–42, May 2013.
12. T. M. Özgökmen, A. C. Poje, P. F. Fischer, H. Childs, H. Krishnan, C. Garth, A. C. Haza, and E. Ryan. On Multi-Scale Dispersion Under the Influence of Surface Mixed Layer Instabilities. *Ocean Modelling*, 56:16–30, Oct. 2012.
13. K. P. Gaither, H. Childs, K. Schulz, C. Harrison, B. Barth, D. Donzis, and P. Yeung. Using Visualization and Data Analysis to Understand Critical Structures in Massive Time Varying Turbulent Flow Simulations. *IEEE Computer Graphics and Applications (CG&A)*, 32(4):34–45, July/Aug. 2012.
14. M. Howison, E. W. Bethel, and H. Childs. Hybrid Parallelism for Volume Rendering on Large-, Multi-, and Many-Core Systems. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 18(1):17–29, Jan. 2012.

15. D. Camp, C. Garth, H. Childs, D. Pugmire, and K. I. Joy. Streamline Integration Using MPI-Hybrid Parallelism on a Large Multicore Architecture. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 17:1702–1713, Nov. 2011.
16. E. W. Bethel, J. Van Rosendale, D. Southard, K. P. Gaither, H. Childs, E. Brugger, and S. Ahern. Visualization at Supercomputing Centers: The Tale of Little Big Iron and the Three Skinny Guys. *IEEE Computer Graphics and Applications (CG&A)*, 31(1):90–95, Jan./Feb. 2011.
17. J. S. Meredith and H. Childs. Visualization and Analysis-Oriented Reconstruction of Material Interfaces. *Computer Graphics Forum (CGF)*, 29(3):1241–1250, June 2010.
18. H. Childs, D. Pugmire, S. Ahern, B. Whitlock, M. Howison, Prabhat, G. Weber, and E. W. Bethel. Extreme Scaling of Production Visualization Software on Diverse Architectures. *IEEE Computer Graphics and Applications (CG&A)*, 30(3):22–31, May/June 2010.
19. M. Isenburg, P. Lindstrom, and H. Childs. Parallel and Streaming Generation of Ghost Data for Structured Grids. *IEEE Computer Graphics and Applications (CG&A)*, 30(3):32–44, May/June 2010.
20. E. J. Kokko, H. E. Martz, D. J. Chinn, H. Childs, J. A. Jackson, D. H. Chambers, D. J. Schneberk, and G. A. Clark. As-Built Modeling of Objects for Performance Assessment. *Journal of Computing and Information Science in Engineering (JCISE)*, 6(4):405–417, Dec. 2006.

Books Edited (Textbooks or Proceedings)

21. J. Bennett, H. Childs, and M. Hadwiger, editors. *Proceedings of the 5th IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, Chicago, IL, Oct. 2015.
22. H. Childs, R. Pajarola, and V. Vishwanath, editors. *Proceedings of the 4th IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, Paris, France, Nov. 2014.
23. E. W. Bethel, H. Childs, and C. Hansen, editors. *High Performance Visualization—Enabling Extreme-Scale Scientific Insight*. Chapman & Hall, CRC Computational Science. CRC Press/Francis–Taylor Group, Boca Raton, FL, USA, Oct. 2012.
<http://www.crcpress.com/product/isbn/9781439875728>.
24. H. Childs, T. Kuhlen, and F. Marton, editors. *Proceedings of the EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)*, Cagliari, Italy, May 2012. EuroGraphics Association.

Peer-Reviewed Book Chapters

25. C. Harrison, J. Weiler, R. Bleile, K. Gaither, and H. Childs. A Distributed-Memory Algorithm for Connected Components Labeling of Simulation Data. In *Topological and Statistical Methods for Complex Data – Tackling Large-Scale, High-Dimensional, and Multivariate Data Sets*, pages 3–21. Springer, Dec. 2014.
26. B. F. Gregorski, D. F. Wiley, H. Childs, B. Hamann, and K. Joy. Adaptive Contouring with Quadratic Tetrahedra. In *Scientific Visualization: The Visual Extraction of Knowledge from Data*, pages 3–15. Springer-Verlag, Heidelberg, Germany, 2006.

Peer-Reviewed Conference and Symposium Proceedings

27. S. Labasan, M. Larsen, H. Childs, and B. Rountree. PaViz: A Power-Adaptive Framework for Optimizing Visualization Performance. In *Eurographics Symposium on Parallel Graphics and Visualization*, pages 1–10, Barcelona, Spain, June 2017.

28. S. Li, N. Marsaglia, V. Chen, C. Sewell, J. Clyne, and H. Childs. Achieving Portable Performance For Wavelet Compression Using Data Parallel Primitives. In *Eurographics Symposium on Parallel Graphics and Visualization*, pages 73–81, Barcelona, Spain, June 2017.
29. R. Bleile, L. Sugiyama, C. Garth, and H. Childs. Accelerating Advection Via Approximate Block Exterior Flow Maps. *Electronic Imaging*, 2017(1):140–148, Feb. 2017.
30. M. Larsen, C. Harrison, J. Kress, D. Pugmire, J. S. Meredith, and H. Childs. Performance Modeling of In Situ Rendering. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC16)*, pages 24:1–24:12, Salt Lake City, UT, Nov. 2016. **Best paper finalist.**
31. M. Larsen, K. Moreland, C. R. Johnson, and H. Childs. Optimizing Multi-Image Sort-Last Parallel Rendering. In *Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 37–46, Baltimore, MD, Oct. 2016.
32. B. Lessley, R. Binyahib, R. Maynard, and H. Childs. External Facelist Calculation with Data-Parallel Primitives. In *Proceedings of EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 10–20, Groningen, The Netherlands, June 2016.
33. S. Labasan, M. Larsen, and H. Childs. Exploring Tradeoffs Between Power and Performance for a Scientific Visualization Algorithm. In *Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 73–80, Chicago, IL, Oct. 2015.
34. S. Li, K. Gruchalla, K. Potter, J. Clyne, and H. Childs. Evaluating the Efficacy of Wavelet Configurations on Turbulent-Flow Data. In *Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 81–89, Chicago, IL, Oct. 2015.
35. J. Kress, E. Anderson, and H. Childs. A Visualization Pipeline for Large-Scale Tractography Data. In *Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 115–123, Chicago, IL, Oct. 2015.
36. M. Larsen, S. Labasan, P. Navrátil, J. Meredith, and H. Childs. Volume Rendering Via Data-Parallel Primitives. In *Proceedings of EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 53–62, Cagliari, Italy, May 2015.
37. M. Larsen, J. Meredith, P. Navrátil, and H. Childs. Ray-Tracing Within a Data Parallel Framework. In *Proceedings of the IEEE Pacific Visualization Symposium*, pages 279–286, Hangzhou, China, Apr. 2015.
38. A. Agranovsky, D. Camp, K. I. Joy, and H. Childs. Subsampling-Based Compression and Flow Visualization. In *SPIE Conference on Visualization and Data Analysis (VDA)*, volume 9397, pages 93970J–01–93970J–14, San Francisco, CA, Feb. 2015.
39. S. Li, G. Griffin, C. Gramazio, H.-J. Schulz, H. Childs, and R. Chang. Exploring Visualization Designs Using Phylogenetic Trees. In *SPIE Conference on Visualization and Data Analysis (VDA)*, volume 9397, pages 939709–01–939709–14, San Francisco, CA, Feb. 2015. **Best paper award.**
40. H. Childs, S. Biersdorff, D. Poliakov, D. Camp, and A. D. Malony. Particle Advection Performance Over Varied Architectures and Workloads. In *IEEE International Conference on High Performance Computing (HiPC)*, pages 1–10, Goa, India, Dec. 2014.
41. A. Agranovsky, D. Camp, C. Garth, E. W. Bethel, K. I. Joy, and H. Childs. Improved Post Hoc Flow Analysis Via Lagrangian Representations. In *Proceedings of the IEEE Symposium on Large Data Visualization and Analysis (LDAV)*, pages 67–75, Paris, France, Nov. 2014. **Best paper award.**

42. D. Camp, H. Krishnan, D. Pugmire, C. Garth, I. Johnson, E. W. Bethel, K. I. Joy, and H. Childs. GPU Acceleration of Particle Advection Workloads in a Parallel, Distributed Memory Setting. In *Proceedings of EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 1–8, Girona, Spain, May 2013.
43. G. H. Weber, H. Childs, and J. S. Meredith. Efficient Parallel Extraction of Crack-free Isosurfaces from Adaptive Mesh Refinement (AMR) Data. In *Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 31–38, Seattle, WA, Oct. 2012.
44. D. Camp, H. Childs, C. Garth, D. Pugmire, and K. I. Joy. Parallel Stream Surface Computation for Large Data Sets. In *Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 39–47, Seattle, WA, Oct. 2012.
45. P. Navrátil, D. Fussell, C. Lin, and H. Childs. Dynamic Scheduling for Large-Scale Distributed-Memory Ray Tracing. In *Proceedings of EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 61–70, Cagliari, Italy, May 2012. **Best paper award.**
46. D. Camp, H. Childs, A. Chousaria, C. Garth, and K. I. Joy. Evaluating the Benefits of An Extended Memory Hierarchy for Parallel Streamline Algorithms. In *Proceedings of the IEEE Symposium on Large Data Visualization and Analysis (LDAV)*, pages 57–64, Providence, RI, Oct. 2011.
47. C. Harrison, H. Childs, and K. P. Gaither. Data-Parallel Mesh Connected Components Labeling and Analysis. In *Proceedings of EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 131–140, Llandudno, Wales, Apr. 2011.
48. T. Fogal, H. Childs, S. Shankar, J. Krüger, R. D. Bergeron, and P. Hatcher. Large Data Visualization on Distributed Memory Multi-GPU Clusters. In *Proceedings of High Performance Graphics (HPG)*, pages 57–66, Saarbrücken, Germany, June 2010.
49. O. Rübel, S. Ahern, E. W. Bethel, M. D. Biggin, H. Childs, E. Cormier-Michel, A. H. DePace, M. B. Eisen, C. C. Fowlkes, C. G. R. Geddes, H. Hagen, B. Hamann, M.-Y. Huang, S. V. E. Keränen, D. W. Knowles, C. L. L. Hendriks, J. Malik, J. S. Meredith, P. Messmer, and Prabhat. Coupling Visualization and Data Analysis for Knowledge Discovery from Multi-Dimensional Scientific Data. *Procedia Computer Science, Proceedings of the International Conference on Computational Science (ICCS)*, 1(1):1757–1764, June 2010.
50. M. Howison, E. W. Bethel, and H. Childs. MPI-hybrid Parallelism for Volume Rendering on Large, Multi-core Systems. In *Eurographics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 1–10, Norrköping, Sweden, Apr. 2010. One of two **best papers**.
51. D. Pugmire, H. Childs, C. Garth, S. Ahern, and G. H. Weber. Scalable Computation of Streamlines on Very Large Datasets. In *Proceedings of the ACM/IEEE Conference on High Performance Computing (SC09)*, Portland, OR, Nov. 2009.
52. O. Rübel, Prabhat, K. Wu, H. Childs, J. Meredith, C. G. R. Geddes, E. Cormier-Michel, S. Ahern, G. H. Weber, P. Messmer, H. Hagen, B. Hamann, and E. W. Bethel. High Performance Multivariate Visual Data Exploration for Extremely Large Data. In *Proceedings of the ACM/IEEE Conference on SuperComputing (SC08)*, Austin, TX, Nov. 2008.
53. E. W. Bethel, O. Rübel, Prabhat, K. Wu, G. H. Weber, V. Pascucci, H. Childs, A. Mascarenhas, J. Meredith, and S. Ahern. Modern Scientific Visualization is More than Just Pretty Pictures. In *International Conference on Numerical Modeling of Space Plasma Flows (Astronum)*, volume 406, pages 301–316, St. Thomas, US Virgin Islands, June 2008.
54. G. H. Weber, V. E. Beckner, H. Childs, T. J. Ligocki, M. Miller, B. van Straalen, and E. W. Bethel. Visualization of Scalar Adaptive Mesh Refinement Data. In *International Conference on Numerical Modeling of Space Plasma Flows (Astronum)*, volume 385, pages 309–320, Paris, France, June 2007.

55. H. Childs, M. Duchaineau, and K.-L. Ma. A Scalable, Hybrid Scheme for Volume Rendering Massive Data Sets. In *Proceedings of Eurographics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 153–162, Braga, Portugal, May 2006.
56. H. Childs and M. Miller. Beyond Meat Grinders: An Analysis Framework Addressing the Scale and Complexity of Large Data Sets. In *SpringSim High Performance Computing Symposium (HPC 2006)*, pages 181–186, Huntsville, AL, Apr. 2006. **Best paper award.**
57. H. Childs, E. S. Brugger, K. S. Bonnell, J. S. Meredith, M. Miller, B. J. Whitlock, and N. Max. A Contract-Based System for Large Data Visualization. In *Proceedings of IEEE Visualization (Vis05)*, pages 190–198, Minneapolis, MN, Oct. 2005.
58. D. F. Wiley, H. Childs, B. Hamann, and K. Joy. Ray Casting Curved-Quadratic Elements. In *Data Visualization, Proceedings of the Symposium on Visualization (VisSym)*, pages 201–209, Konstanz, Germany, May 2004.
59. D. Fang, G. H. Weber, H. Childs, E. S. Brugger, B. Hamann, and K. Joy. Extracting Geometrically Continuous Isosurfaces from Adaptive Mesh Refinement Data. In *Proceedings of 2004 Hawaii International Conference on Computer Sciences*, pages 216–224, Honolulu, HI, Jan. 2004.
60. D. F. Wiley, H. Childs, B. F. Gregorski, B. Hamann, and K. Joy. Contouring Curved Quadratic Elements. In *Data Visualization, Proceedings of the Symposium on Visualization (VisSym)*, pages 167–176, Grenoble, France, May 2003.
61. D. F. Wiley, H. Childs, B. Hamann, K. Joy, and N. Max. Using Quadratic Simplicial Elements for Hierarchical Approximation and Visualization. In *SPIE Conference on Visualization and Data Analysis (VDA)*, volume 4665, pages 32–43, San Jose, CA, Jan. 2002.
62. D. F. Wiley, H. Childs, B. Hamann, K. Joy, and N. Max. Best Quadratic Spline Approximation for Hierarchical Visualization. In *Data Visualization, Proceedings of the Symposium on Visualization (VisSym)*, pages 133–140, Barcelona, Spain, May 2002.
63. D. V. Pinskiy, E. S. Brugger, H. Childs, and B. Hamann. An Octree-Based Multiresolution Approach Supporting Interactive Rendering of Very Large Volume Data Sets. In *Proceedings of the International Conference on Imaging Science, Systems, and Technology (CISST)*, volume 1, pages 16–22, Las Vegas, NV, June 2001.

Peer-Reviewed Workshop Proceedings

64. J. Kress, S. Klasky, D. Pugmire, and H. Childs. Visualization and Analysis Requirements for In Situ Processing for a Large-Scale Fusion Simulation Code. In *Proceedings of the Second Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV), held in conjunction with SC16*, pages 45–50, Salt Lake City, UT, Nov. 2016.
65. D. Pugmire, J. Kress, J. Choi, S. Klasky, T. Kurc, R. Churchill, M. Wolf, G. Eisenhauer, H. Childs, K. Wu, A. Sim, J. Gu, and J. Low. Visualization and Analysis for Near-Real-Time Decision Making in Distributed Workflows. In *High Performance Data Analysis and Visualization (HPDAV) 2016 held in conjunction with IPDPS 2016*, pages 1007–1013, May 2016.
66. J. Kress, S. Klasky, N. Podhorszki, J. Choi, H. Childs, and D. Pugmire. Loosely coupled in situ visualization: A perspective on why it’s here to stay. In *Proceedings of the First Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV), held in conjunction with SC15*, pages 1–6, Austin, TX, Nov. 2015.
67. M. Larsen, E. Brugger, H. Childs, J. Eliot, K. Griffin, and C. Harrison. Strawman: A batch in situ visualization and analysis infrastructure for multi-physics simulation codes. In *Proceedings of the First Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV), held in conjunction with SC15*, pages 30–35, Austin, TX, Nov. 2015.

68. K. A. Huck, K. Potter, D. W. Jacobsen, H. Childs, and A. D. Malony. Linking Performance Data into Scientific Visualization Tools. In *1st Workshop on Visual Performance Analysis (VPA), held in conjunction with SC14*, pages 50–57, New Orleans, LA, Nov. 2014.
69. C. Harrison, P. Navrátil, M. Mossalem, M. Jiang, and H. Childs. Efficient Dynamic Derived Field Generation on Many-Core Architectures Using Python. In *Workshop on Python for High Performance and Scientific Computing (PyHPC 2012), held in conjunction with the ACM/IEEE Conference on SuperComputing (SC12), and printed in SC Companion 2012*, pages 583–592, Salt Lake City, UT, Nov. 2012.
70. G. H. Weber, V. E. Beckner, H. Childs, T. J. Ligocki, M. Miller, B. van Straalen, and E. W. Bethel. Visualization Tools for Adaptive Mesh Refinement Data. In *Proceedings of the 4th High End Visualization Workshop*, pages 12–25, Tyrol, Austria, June 2007.

Peer-Reviewed Short Papers

71. R. C. Bleile, P. S. Brantley, M. J. O’Brien, and H. Childs. Algorithmic Improvements for Portable Event-Based Monte Carlo Transport Using the Nvidia Thrust Library. In *Transactions of the American Nuclear Society (Proceedings of the ANS Annual Meeting)*, volume 115, pages 535–538, Las Vegas, NV, Nov. 2016.
72. R. C. Bleile, P. S. Brantley, S. A. Dawson, M. J. O’Brien, and H. Childs. Investigation of Portable Event-Based Monte Carlo Transport Using the NVIDIA Thrust Library. In *Transactions of the American Nuclear Society (Proceedings of the ANS Annual Meeting)*, volume 114, pages 941–944, New Orleans, LA, June 2016.
73. S. Ahern, E. Brugger, B. Whitlock, J. S. Meredith, K. Biagas, M. C. Miller, and H. Childs. VisIt: Experiences with Sustainable Software. In *Workshop on Sustainable Software for Science: Practice and Experiences (WSSSPE), held in conjunction with ACM/IEEE Conference on SuperComputing (SC13)*, Nov. 2013. Note: per workshop instructions, self-published (in arXiv, as 1309.1796) and then peer-reviewed by WSSSPE program committee after self-publication.
74. D. Camp, E. W. Bethel, and H. Childs. Transitioning Data Flow-Based Visualization Software to Multi-Core Hybrid Parallelism. In *3rd International Workshop on Data-Flow Execution Models for Extreme Scale Computing (DFM 2013)*, pages 59–62, Edinburgh, Scotland, Sept. 2013.
75. P. Navrátil, B. Barth, and H. Childs. Virtual Rheoscopic Fluids for Dense, Large-Scale Fluid Flow Visualizations. In *Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 79–84, Seattle, WA, Oct. 2012.
76. A. R. Sanderson, B. Whitlock, O. Rübél, H. Childs, G. H. Weber, Prabhat, and K. Wu. A System for Query Based Analysis and Visualization. In *Third International Eurovis Workshop on Visual Analytics (EuroVA 2012)*, pages 25–29, Vienna, Austria, June 2012.
77. M. Howison, E. W. Bethel, and H. Childs. Hybrid Parallelism for Volume Rendering on Large, Multi-core Systems. In *International Conference of Numerical Modeling of Space Plasma Flows (Astronom)*, volume 444, pages 275–280, San Diego, CA, June 2010.
78. G. H. Weber, S. Ahern, E. W. Bethel, S. Borovikov, H. R. Childs, E. Deines, C. Garth, H. Hagen, B. Hamann, K. I. Joy, D. Martin, J. Meredith, Prabhat, D. Pugmire, O. Rübél, B. Van Straalen, and K. Wu. Recent Advances in VisIt: AMR Streamlines and Query-Driven Visualization. In *International Conference on Numerical Modeling of Space Plasma Flows (Astronom)*, volume 429, pages 329–334, Chamonix, France, June 2009.

Contributed Book Chapters

79. H. Childs. Parallel Visualization Frameworks. In *High Performance Visualization—Enabling Extreme-Scale Scientific Insight*, pages 9–24. CRC Press/Francis–Taylor Group, Oct. 2012.
80. H. Childs, K.-L. Ma, H. Yu, B. Whitlock, J. Meredith, J. Favre, S. Klasky, N. Podhorszki, K. Schwan, M. Wolf, M. Parashar, and F. Zhang. In Situ Processing. In *High Performance Visualization—Enabling Extreme-Scale Scientific Insight*, pages 171–198. CRC Press/Francis–Taylor Group, Oct. 2012.
81. E. W. Bethel, D. Camp, H. Childs, C. Garth, M. Howison, K. I. Joy, and D. Pugmire. Hybrid Parallelism. In *High Performance Visualization—Enabling Extreme-Scale Scientific Insight*, pages 261–290. CRC Press/Francis–Taylor Group, Oct. 2012. Note: this chapter is an amalgam of the results found in publications #13 and #14.
82. H. Childs, D. Pugmire, S. Ahern, B. Whitlock, M. Howison, Prabhat, G. Weber, and E. W. Bethel. Visualization at Extreme Scale Concurrency. In *High Performance Visualization—Enabling Extreme-Scale Scientific Insight*, pages 291–306. CRC Press/Francis–Taylor Group, Oct. 2012. Note: this chapter is derived from, and highly similar to, publication #18.
83. H. Childs, E. Brugger, B. Whitlock, J. Meredith, S. Ahern, D. Pugmire, K. Biagas, M. Miller, C. Harrison, G. H. Weber, H. Krishnan, T. Fogal, A. Sanderson, C. Garth, E. W. Bethel, D. Camp, O. Rübel, M. Durant, J. M. Favre, and P. Navrátil. VisIt: An End-User Tool For Visualizing and Analyzing Very Large Data. In *High Performance Visualization—Enabling Extreme-Scale Scientific Insight*, pages 357–372. CRC Press/Francis–Taylor Group, Oct. 2012. Note: this chapter is derived from, and highly similar to, publication #85.
84. E. W. Bethel, H. Childs, A. Mascarenhas, V. Pascucci, and Prabhat. Scientific Data Management Challenges in High Performance Visual Data Analysis. In A. Shoshani and D. Rotem, editors, *Scientific Data Management: Challenges, Existing Technology, and Deployment*, pages 325–368. Chapman & Hall/CRC Press, Dec. 2009.

Invited Papers (full papers that accompany an invited talk)

85. H. Childs, E. Brugger, B. Whitlock, J. Meredith, S. Ahern, K. Bonnell, M. Miller, G. H. Weber, C. Harrison, D. Pugmire, T. Fogal, C. Garth, A. Sanderson, E. W. Bethel, M. Durant, D. Camp, J. M. Favre, O. Rübel, P. Navrátil, M. Wheeler, P. Selby, and F. Vivodtzev. VisIt: An End-User Tool For Visualizing and Analyzing Very Large Data. In *Proceedings of SciDAC 2011*, Denver, CO, July 2011.
86. S. Klasky, H. Abbasi, J. Logan, M. Parashar, K. Schwan, A. Shoshani, M. Wolf, S. Ahern, I. Altintas, W. Bethel, L. Chacon, C. Chang, J. Chen, H. Childs, J. Cummings, S. Ethier, R. Grout, Z. Lin, Q. Liu, X. Ma, K. Moreland, V. Pascucci, N. Podhorszki, N. Samatova, W. Schroeder, R. Tchoua, J. Wu, and W. Yu. In Situ Data Processing for Extreme-Scale Computing. In *Proceedings of SciDAC 2011*, Denver, CO, July 2011.
87. M. Howison, E. W. Bethel, and H. Childs. Hybrid Parallelism for Volume Rendering on Large, Multi-core Systems. In *Proceedings of the 2010 Scientific Discovery through Advanced Computing (SciDAC) Conference*, pages 188–193, Chattanooga, TN, July 2010. Note: this publication is derived from, and highly similar to, publication #49.
88. H. Childs, S. Ahern, J. Meredith, M. Miller, and K. I. Joy. Comparative Visualization Using Cross-Mesh Field Evaluations and Derived Quantities. In *Scientific Visualization: Interactions, Features, Metaphors*, volume 2 of *Dagstuhl Follow-Ups*, pages 59–72. Wadern, Germany, June 2009.
89. K. Wu, S. Ahern, E. W. Bethel, J. Chen, H. Childs, E. Cormier-Michel, C. G. R. Geddes, J. Gu, H. Hagen, B. Hamann, W. Koegler, J. Laurent, J. Meredith, P. Messmer, E. Otoo, V. Perevoztchikov,

- A. Poskanzer, Prabhat, O. Rübel, A. Shoshani, A. Sim, K. Stockinger, G. Weber, and W.-M. Zhang. FastBit: Interactively Searching Massive Data. In *Journal of Physics Conference Series, Proceedings of SciDAC*, volume 180, page 012053, San Diego, CA, June 2009.
90. E. W. Bethel, C. Johnson, S. Ahern, J. Bell, P.-T. Bremer, H. Childs, E. Cormier-Michel, M. Day, E. Deines, T. Fogal, C. Garth, C. G. R. Geddes, H. Hagen, B. Hamann, C. Hansen, J. Jacobsen, K. Joy, J. Krüger, J. Meredith, P. Messmer, G. Ostrouchov, V. Pascucci, K. Potter, Prabhat, D. Pugmire, O. Rübel, A. Sanderson, C. Silva, D. Ushizima, G. Weber, B. Whitlock, and K. Wu. Occam's Razor and Petascale Visual Data Analysis. In *Journal of Physics Conference Series, Proceedings of SciDAC*, volume 180, page 012084, San Diego, CA, June 2009.
91. H. Childs. Architectural Challenges and Solutions for Petascale Postprocessing. In *Journal of Physics Conference Series, Proceedings of SciDAC*, volume 78, page 012012, Boston, MA, June 2007.
92. E. W. Bethel, C. Johnson, K. Joy, S. Ahern, V. Pascucci, H. Childs, J. Cohen, M. A. Duchaineau, B. Hamann, C. D. Hansen, D. E. Laney, P. Lindstrom, J. S. Meredith, G. Ostrouchov, S. Parker, C. T. Silva, A. Sanderson, and X. Tricoche. SciDAC Visualization and Analytics Center for Enabling Technology. In *Journal of Physics Conference Series, Proceedings of SciDAC*, volume 78, page 012032, Boston, MA, June 2007.
93. K. Joy, M. Miller, H. Childs, W. Bethel, J. Clyne, G. Ostrouchov, and S. Ahern. Frameworks for Visualization at the Extreme Scale. In *Journal of Physics Conference Series, Proceedings of SciDAC*, volume 78, page 012035, Boston, MA, June 2007.
94. E. W. Bethel, C. Johnson, C. Hansen, S. Parker, A. Sanderson, C. Silva, X. Tricoche, V. Pascucci, H. Childs, J. Cohen, M. Duchaineau, D. Laney, P. Lindstrom, S. Ahern, J. Meredith, G. Ostrouchov, K. Joy, and B. Hamann. VACET: Proposed SciDAC2 Visualization and Analytics Center for Enabling Technologies. In *Journal of Physics Conference Series, Proceedings of SciDAC*, volume 46, pages 561–569, Denver, CO, June 2006.

Papers With Peer-Reviewed Abstracts

95. H. Krishnan, C. Harrison, B. Whitlock, D. Pugmire, and H. Childs. Exploring Collaborative HPC Visualization Workflows using VisIt and Python. In *Proceedings of the 12th Python in Science Conference (SciPy 2013)*, pages 69–73, Austin, TX, June 2013.

Workshop Reports/Magazine Articles/Other Publications

96. S. Ahern, A. Shoshani, K.-L. Ma, A. Choudhary, T. Critchlow, S. Klasky, Valerio Pascucci, J. Ahrens, E. W. Bethel, H. Childs, J. Huang, K. I. Joy, Q. Koziol, J. Lofstead, J. Meredith, K. Moreland, G. Ostrouchov, M. Papka, V. Vishwanath, M. Wolf, N. Wright, and K. J. Wu. Scientific Discovery at the Exascale: Report for the DOE ASCR Workshop on Exascale Data Management, Analysis, and Visualization, July 2011.
97. C. Garth, E. Deines, K. I. Joy, E. W. Bethel, H. Childs, G. Weber, S. Ahern, D. Pugmire, A. Sanderson, and C. Johnson. Twists and Turns: Vector Field Visual Data Analysis for Petascale Computational Science. *SciDAC Review*, 15:10–21, Winter 2009.
98. E. W. Bethel, C. Johnson, C. Hansen, C. Silva, S. Parker, A. Sanderson, L. Myers, M. Cole, X. Tricoche, S. Ahern, G. Ostrouchov, D. Pugmire, J. Daniel, J. Meredith, V. Pascucci, H. Childs, P.-T. Bremer, A. Mascarenhas, K. Joy, B. Hamann, C. Garth, C. Aragon, G. Weber, and Prabhat. Seeing the Unseeable. *SciDAC Review*, 8(8):24–33, Summer 2008.
99. D. Pugmire, H. Childs, and S. Ahern. Parallel Analysis and Visualization on Cray Compute Node Linux. In *Cray Users Group (CUG) Meeting*, Helsinki, Finland, May 2008.

100. E. W. Bethel, C. Johnson, C. Aragon, Prabhat, O. Rübél, G. Weber, V. Pascucci, H. Childs, P.-T. Bremer, B. Whitlock, S. Ahern, J. Meredith, G. Ostrouchov, K. Joy, B. Hamann, C. Garth, M. Cole, C. Hansen, S. Parker, A. Sanderson, C. Silva, and X. Tricoche. DOE's SciDAC Visualization and Analytics Center for Enabling Technologies – Strategy for Petascale Visual Data Analysis Success. *CTWatch Quarterly*, 3(4):32–40, Nov. 2007.

Software Artifacts

- VisIt (project architect 2000-2013, participant 2013-present)
 - VisIt is developed by over a dozen developers, is used at supercomputing centers around the world, has been downloaded more than 200,000 times, and was recognized with an R&D 100 award in 2005.
 - Childs designed and implemented the initial version of the library for VisIt's parallelized large data handling. This library addressed key data model issues, data flow paradigms, parallelization models, and visualization and analysis algorithms. The library is now more than 350,000 lines of code and worked on by many developers.

Keynote Presentations

- K1. IXPUG Workshop on Software-Defined Visualization, “State of the Art for In Situ Visualization,” Austin, TX, May 2017.
- K2. ISC High Performance Workshop on In Situ Visualization, “In Situ Processing: Instantiations, Opportunities, and Challenges,” Frankfurt, Germany, June 2016.
- K3. 18th International Workshop on Vision, Modeling, and Visualization (VMV), “Hybrid Parallelism and Visualization,” Lugano, Switzerland, September 2013.
- K4. Third Annual Workshop on Large Scale Visualization (sponsored by Intelligent Light Systems Corp. and RIKEN), “VisIt: Visualizing and Analyzing Very Large Data,” Kobe, Japan, October 2012.
- K5. International Workshop on Logic and Synthesis (IWLS), “Exascale Visualization: Get Ready For A Whole New World,” Berkeley, CA, June 2012.
- K6. Idaho Modeling, Simulation, and Visualization Workshop, “Exascale Visualization: Get Ready For A Whole New World,” Boise, ID, September 2011.
- K7. EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV), “Exascale Visualization: Get Ready For A Whole New World,” Llandudno, Wales, April 2011.
- K8. IEEE Visualization Workshop on Refactoring Visualization from Experience (REVISE), “Why Petascale Visualization Will Change the Rules,” Atlantic City, NJ, October 2009.
- K9. International Conference on Computational Science (ICCS), “Why Petascale Visualization and Analysis Will Change the Rules,” Krakow, Poland, June 2008.

Invited Speaker at Conferences/Workshops/Events

- I1. ISC High Performance Conference, “In Situ Processing: Opportunities, Challenges, and Instantiations,” Frankfurt, Germany, June 2017.
- I2. Smoky Mountains Computational Sciences and Engineering Conference, “In Situ Processing: Opportunities, Challenges, and Instantiations,” Gatlinburg, TN, September 2016.
- I3. International Computing for the Atmospheric Sciences Symposium (iCAS2015), “Exascale Visualization: Get Ready For a Whole New World,” Annecy, France, September 2015.
- I4. Supercomputing Frontiers Conference, “Data Exploration at the Exascale,” Singapore, March 2015.
- I5. Intel Visualization Users Group Meeting, “The State of Scientific Visualization With Respect to Many-Core,” Santa Clara, CA, May 2014.
- I6. KAUST Visualization Summit, “Exascale Visualization: Get Ready For a Whole New World,” Thuwal, Saudi Arabia, April 2013.

- I17. VINAS (Visual Integration & Numerical Analysis Systems) Corporation Users Meeting, “VisIt: Visualizing and Analyzing Very Large Data,” Tokyo, Japan, October 2012.
- I18. American Geophysical Union (AGU) Fall Meeting, Workshop on Challenges in Analysis and Visualization of Large Earth Science Data, “Efficient Visualization and Analysis of Very Large Climate Data,” San Francisco, CA, December 2011.
- I19. Society of Exploration Geophysicists’ (SEG) Workshop on High Performance Computing for the Geosciences, “Challenges and Solutions for Visual Data Analysis on Current and Emerging HPC Platforms,” along with co-presenter Wes Bethel, Berkeley, CA, July 2011.
- I10. Institute for Nuclear Theory (INT): Extreme Computing and its Implications for the Nuclear Physics/Applied Mathematics/Computer Science Interface, “Exascale Visualization: Get Ready for a Whole New World,” Seattle, WA, July 2011.
- I11. Center for Scalable Application Development (CScADS) Summer Workshop, “Parallel Particle Advection,” Snowbird, Utah, July 2010.
- I12. NSF Workshop on Extreme Scale I/O and Data Analysis, “Petascale I/O Impacts on Visualization,” Austin, TX, March 2010.
- I13. International Conference on Turbulent Mixing and Beyond (TMB-2009), “VisIt, What Analysis Should We Be Doing?, and How Will We Do It With Big Data?,” Trieste, Italy, July 2009.
- I14. Blue Waters Workshop, “Why Petascale Visualization and Analysis Will Change the Rules,” Urbana, IL, October 2008.
- I15. Center for Scalable Application Development (CScADS) Summer Workshop, “Why Petascale Visualization and Analysis Will Change the Rules,” Snowbird, Utah, July 2008.
- I16. Fall Creek Falls Conference, “Why Petascale Visualization and Analysis Will Change the Rules,” Nashville, TN, September 2007.
- I17. Scientific Discovery through Advanced Computing (SciDAC) Conference, “Why Petascale Visualization and Analysis Will Change the Rules,” Boston, MA, June 2007.
- I18. Computational Engineering and Science Conference (CESC), “VisIt: a Flexible Integrated Visualization and Analysis Environment,” Washington DC, April 2007.

Invited Presentations at Universities

- I19. University of Tennessee, “Exascale Visualization and In Situ Processing,” Knoxville, TN, September 2016.
- I20. University of Arizona, “Exascale Computing, Flow Visualization, and Data Exploration: A Strategy for Achieving All Three,” Tucson, AZ, January 2016.
- I21. Universität Stuttgart, “Exascale Visualization: Get Ready For a Whole New World,” Stuttgart, Germany, September 2015.
- I22. University of Texas, Texas Advanced Computing Center (TACC), “Exascale Computing, Flow Visualization, and Data Exploration: A Strategy for Achieving All Three,” Austin, TX, January 2015.
- I23. Rheinisch-Westfaelische Technische Hochschule (RWTH)-Aachen, “Exascale Visualization: A Paradigm Shift and Four Big Challenges,” Aachen, Germany, March 2014.
- I24. Technische Universität Kaiserslautern, “Hybrid Parallelism and Visualization,” Kaiserslautern, Germany, September 2013.
- I25. Oregon State University EECS Colloquium, “Exascale Visualization: Get Ready For a Whole New World,” Corvallis, OR, April 2013.
- I26. UC Berkeley CITRIS Research Exchange Series, “Visualization of Very Large Scientific Simulations,” Berkeley, CA, May 2012.
- I27. University of Maryland, Institute for Advanced Computer Studies (UMIACS), “Exascale Visualization: Get Ready For A Whole New World,” College Park, MD, September 2011.
- I28. Boise State University, “VisIt: Visualization and Analysis for Extreme Scale Data,” Boise, ID, September 2011.
- I29. Louisiana State Colloquium Series, “Overview of the VisIt Project,” Baton Rouge, LA, October 2008.

Invited Presentations at Laboratories

- I30. Oak Ridge National Laboratory, “In Situ Processing: Opportunities, Challenges, and Instantiations,” Oak Ridge, TN, August 2016.
- I31. National Center for Atmospheric Research, “Exascale Visualization: What Will Change,” Boulder, CO, March 2016.
- I32. Intel Corporation, “Exascale Visualization: A Paradigm Shift,” Hillsboro, OR, February 2015.
- I33. Los Alamos National Laboratory, “Exascale Computing, Flow Visualization, and Data Exploration: A Strategy For Achieving All Three,” Los Alamos, NM, September 2014.
- I34. Jülich Research Centre, “Exascale Visualization: A Paradigm Shift and Four Big Challenges,” Jülich, Germany, March 2014.
- I35. Swiss National Supercomputing Centre (CSCS), “Hybrid Parallelism and Visualization,” Lugano, Switzerland, September 2013.
- I36. Pacific Northwest National Laboratory (PNNL), “Exascale Visualization: Get Ready For a Whole New World,” Richland, WA, March 2013.
- I37. National Renewable Energy Laboratory (NREL), “Exascale Visualization: Get Ready For a Whole New World,” Golden, CO, November 2012.
- I38. NASA Ames, “Overview of VisIt,” Mountain View, CA, February 2011.

Invited Seminars/Workshops

- I39. Schloss Dagstuhl Seminar on Scientific Visualization, “Exascale Computing and Uncertainty Visualization,” Wadern, Germany, June 2014.
- I40. Schloss Dagstuhl Perspectives Workshop on Connecting Performance Analysis and Visualization to Advance Extreme Scale, “Some Inspiration from Scientific Visualization...,” Wadern, Germany, January 2014.

Invited Webinars

- I41. Computational Infrastructure for Geodynamics (CIG) Webinar Series, “Exascale Visualization: Why Things Will Change For You,” February 2014.
- I42. Intel’s Open Source Software Innovators Series, “Visualizing Large Complex Data Sets With VisIt,” June 2013.

Current Funding (PI)

- DOE Exascale Computing Program (ECP), “ALPINE: Algorithms and Infrastructure for In Situ Visualization and Analysis,” 1/2017-12/2019. Overall PI: Jim Ahrens, Los Alamos. Overall Deputy PI and Oregon PI: Hank Childs (\$560,595). Other PIs: Eric Brugger, LLNL, Berk Geveci, Kitware, Inc., Gunther Weber, Lawrence Berkeley.
- DOE Exascale Computing Program (ECP), “VTK-m: Updating HPC Visualization Software for Exascale-Era Processors,” 1/2017-12/2019. Overall PI: Ken Moreland, Sandia. Oregon PI: Hank Childs (\$420,100). Other PIs: Berk Geveci, Kitware, Inc., David Rogers, Los Alamos, David Pugmire, Oak Ridge.
- NSF, “Support for the 2017 IEEE Visualization Conference (VIS) Doctoral Colloquium,” 5/2017-10/2017, \$20,000.
- DOE Early Career, “Data Exploration at the Exascale,” 9/2013-8/2017, \$600,000. PI: Hank Childs (UO).
- DOE Office of Science, “XVis: Visualization for the Extreme-Scale Scientific-Computation Ecosystem,” 9/2014-8/2017, \$4,040,000. Overall PI: Ken Moreland, Sandia. Oregon PI: Hank Childs (\$374K). Other PIs: Chris Sewell, LANL, Berk Geveci, Kitware Inc., Jeremy Meredith, ORNL, Kwan-Liu Ma, UC Davis.

- Intel Parallel Computing Center, “VisIt on the Xeon Phi,” 4/2014-4/2017, \$450,000. Overall PI: Jian Huang, UT-Knoxville. Oregon PI: Hank Childs (\$180,000).
- NSF SI2, “A Comprehensive Ray Tracing Framework for Visualization in Distributed-Memory Parallel Environments,” 10/2013-9/2016 (currently on no cost extension), \$1,198,122. Overall PI: Paul Navratil, UT-Austin. Oregon PI: Hank Childs (\$235,961). Other PIs: Chuck Hansen, Univ. Utah, Allen Malony, ParaTools Inc.

Previous Funding (PI)

- DOE Office of Science, “Optimizing Power Usage for Data-Intensive Workflows and Algorithms on Modern Computing Architectures,” 9/2013-8/2016, \$1,050,000. PI: Hank Childs (LBNL), Co-PIs: Wes Bethel, John Shalf, Suren Byna.
- DOE Office of Science SciDAC, “Scalable Data Management, Analysis, and Visualization Institute (SDAV),” 2/2012-1/2017, \$25,000,000. Overall PI: Arie Shoshani, LBNL. Oregon PI: Hank Childs (\$294,389, via sub-contract from LBNL, running 11/13-1/17). Fourteen institutions total, including seven universities, six national laboratories, and a private company.
- Conoco Philips Corporation, “Visualization of Oil Data,” 1/2014-3/2015, \$80,000. Overall PI: Kelly Gaither, UT-Austin. Oregon PI: Hank Childs. Note 1: this funding is a contract and not a grant. It was not peer-reviewed. Note 2: PI Childs receives \$80K as part of a larger collaboration with UT-Austin. UT-Austin receives additional funds from Conoco Philips and directs the overall project.
- DOE Office of Nuclear Energy, “Visualization of Fast Reactors,” 10/2007-9/2013, \$1,450,000. PI: Hank Childs (LLNL/LBNL). Note: this funding was a contract and not a grant. It was not peer-reviewed.
- NSF XD, “Visualization on Longhorn XD,” 8/2009-8/2012, \$150,000. PI: Hank Childs (UC Davis). Note: this funding was a sub-contract from a \$7M NSF XD center, headed by Kelly Gaither, UT-Austin, that was made after the award.
- DOE Office of Science SciDAC, “The Visualization and Analytics Center for Enabling Technologies (VACET),” 9/2006-8/2011, \$11,000,000. Overall PI: Wes Bethel, LBNL. Note: this was a five institution grant (LBNL, ORNL, LLNL, Univ. Utah, and UC Davis), and PI-ship for institutions varied over the life of the project. Childs was PI intermittently, based on affiliation. The funds managed by Childs was \$1,140,000 (based on the \$228,000/year transfer made when Childs changed affiliation to LBNL).

Previous Funding (Co-I)

- Intel Corporation, “Academic Program in Parallel Computing,” 1/2014-12/2014, \$100,000. PI: Allen Malony, Co-I: Hank Childs, Boyana Norris.
- DOE Office of Science, “Towards Exascale: High Performance Visualization and Analytics,” 10/2011-9/2014, \$2,175,000. PI: Wes Bethel. Co-I: Hank Childs, Gunther Weber, Prabhat, Dani Ushizima. Roles: proposal team, participant.
- DOE Office of Science (BER), “Visual Data Exploration and Analysis of Ultra-large Climate Data,” 10/2010-9/2013, \$5,100,000. Institutions: LBNL, LLNL, UC Berkeley, LANL, ORNL. Roles: proposal team, Chief Software Architect, participant.

Funding Via Student Fellowships

- Ryan Bleile, Lawrence Scholar Graduate Fellow (full support for up to 4 years of Ph.D. research): “Simulating Monte Carlo Nuclear Particle Transport On Advanced Computing Architectures.” Awarded May 2015.
- Stephanie Labasan, Lawrence Scholar Graduate Fellow (full support for up to 4 years of Ph.D. research): “Optimal Power Scheduling for Visualization on Supercomputers.” Awarded May 2015.

Courses Taught

- CIS 330: Unix, C, and C++. Spring 2014, Spring 2015, Spring 2016, Spring 2017.
- CIS 410/510: Introduction to Scientific Visualization. Fall 2013, Fall 2015.
- CIS 441/541: Introduction to Computer Graphics. Spring 2013, Fall 2014, Fall 2016.
- CIS 610: Many-Core Visualization Libraries. Winter 2014.
- CIS 610: Visualization and Portable Performance. Fall 2015.

Extra-Curricular Teaching

- Vlaams Supercomputer Centrum Training on “Visualization with VTK and VisIt,” Leuven, Belgium. Instructor for invited short course (6 lecture hours, 6 lab hours), June 2016.
- Hartree Summer School Series on “Visualization,” Warrington, England. Co-organizer of week-long course and also course instructor (6 lecture hours, 6 lab hours), June 2015.
- Hartree Summer School Series on “Visualization,” Warrington, England. Co-organizer of week-long course and also course instructor (6 lecture hours, 6 lab hours), July 2014.
- EU Regional School on “Visualization and Analysis of Very Large Data,” Aachen, Germany. Instructor for invited short course (6 lecture hours), March 2014.
- CEA/INRIA/EDF Summer School on “How to Build a Visualization Application for Very Large Data,” Saint Paul-lez-Durance, France. Instructor for invited short course (10 lecture hours, 10 lab hours), June 2011.
- Conference tutorials. All tutorials accepted based on peer-reviewed proposals.
 - Tu1. “Parallel Visualization for Very Large Data Simulations” at International Supercomputing Conference (ISC), Hamburg, Germany, June 2011.
 - Tu2. “Large Vector-Field Visualization: Theory and Practice” at IEEE Visualization, Salt Lake City, UT, October 2010.
 - Tu3. “Visualization of Time-Varying Vector Fields” at IEEE Visualization, Atlantic City, NJ, October 2009.

Teaching for VisIt Visualization Software

- King Abdullah University of Science and Technology (KAUST) Winter Enrichment Program (WEP) on “Scientific Data Visualization Using VisIt,” Thuwal, Saudi Arabia. Instructor for invited short course (4 lecture hours), January 2011.
- Conference tutorials on VisIt software. All tutorials accepted based on peer-reviewed proposals.
 - Tu4. “Scalable HPC Visualization and Data Analysis Using VisIt” at ACM/IEEE SuperComputing (SC) Conference, Salt Lake City, UT, November 2016.
 - Tu5. “Effective HPC Visualization and Data Analysis using VisIt” at ACM/IEEE SuperComputing (SC) Conference, Austin, TX, November 2015.
 - Tu6. “Effective HPC Visualization and Data Analysis using VisIt” at ACM/IEEE SuperComputing (SC) Conference, Denver, CO, November 2013.
 - Tu7. “Large Scale Visualization and Data Analysis with VisIt” at ACM/IEEE SuperComputing (SC) Conference, Salt Lake City, UT, November 2012.
 - Tu8. “Large Scale Data Visualization with VisIt” at International Supercomputing Conference (ISC), Hamburg, Germany, June 2012.

- Tu9. “Introduction to VisIt” at Scientific Discovery through Advanced Computing (SciDAC) Conference, Denver, CO, July 2011.
- Tu10. “Introduction to VisIt: Visualization and Analysis for Very Large Data Sets” at ACM/IEEE SuperComputing (SC) Conference, New Orleans, LA, November 2010.
- Tu11. “Advanced VisIt Usage: Visualization and Analysis for Very Large Data Sets” at ACM/IEEE SuperComputing (SC) Conference, New Orleans, LA, November 2010.
- Tu12. “Introduction to VisIt” at Scientific Discovery through Advanced Computing (SciDAC) Conference, Chattanooga, TN, July 2010.
- Tu13. “VisIt–Visualization and Analysis For Very Large Data Sets” at ACM/IEEE SuperComputing (SC) Conference, Portland, OR, November 2009.
- Tu14. “Visualization and Analysis Using VisIt” at IEEE Visualization, Atlantic City, NJ, October 2009.
- Tu15. “Introduction to VisIt” at Scientific Discovery through Advanced Computing (SciDAC) Conference, San Diego Supercomputing Center, San Diego, CA, June 2009.
- Tu16. “Advanced Visualization and Data Analysis with the VisIt Visualization System” at Scientific Discovery through Advanced Computing (SciDAC) Conference, Microsoft Research Center, Seattle, WA, July 2008.

- VisIt tutorials for organizations

- Tu17. “Introduction to VisIt” for the US Army Research Laboratory, Aberdeen, MD, September, 2010.
- Tu18. “Introduction to VisIt” at the NERSC Users Group Meeting, hosted by Tech-X Corporation, Boulder, CO, October 2009.
- Tu19. “Introduction to VisIt” for Princeton University and Princeton Plasma Physics Laboratory, Princeton, NJ, July 2009.

- Invited lectures on VisIt visualization software for student workshops

- Argonne Training Program on Extreme-Scale Computing (ATPESC), St. Charles, IL, August 2013.
- San Diego Supercomputer Center (SDSC) Summer Institute, San Diego, CA, August 2012.
- 12th Workshop of the DOE ACTS (Advanced CompuTational Software) Collection, Berkeley, CA, August 2011.
- UC Santa Cruz Visualization Summer Workshop, Santa Cruz, CA, July 2011.
- UC-HiPACC (Univ. of Ca. High-Performance AstroComputing Center) International Summer School on AstroComputing, Berkeley, CA, July 2011.
- Center for Scalable Application Development (CScADS) Summer Workshop, Snowbird, Utah, July 2010.
- Center for Scalable Application Development (CScADS) Summer Workshop. Lake Tahoe, NV, August 2009.
- 10th Workshop of the DOE ACTS (Advanced CompuTational Software) Workshop, Berkeley, CA, August 2009.
- Center for Scalable Application Development (CScADS) Summer Workshop, Snowbird, UT, July 2008.

Current Student Advising

- Ph.D. students

- Shaomeng (Samuel) Li, 6/2013-9/2017. Scientific visualization.
- Ryan Bleile, 9/2013-6/2018. Computational science.
- James Kress, 9/2013-6/2018. Scientific visualization.
- Stephanie Labasan, 9/2013-6/2018. Energy-efficient HPC.
- Brenton Lessley, 2/2015-6/2018. Scientific visualization.

- Roba Binyahib, 6/2014-12/2018. Scientific visualization.
- Sudhanshu Sane, 12/2015-6/2019. Flow visualization.
- Nicole Marsaglia, 2/2016-6/2019. Scientific visualization.
- M.S. students
 - Shawn Sadler, 9/2016-6/2018. Virtual reality and visualization.
 - Abhishek Yempure, 9/2016-6/2018. Parallel rendering.
 - Manish Mathai, 1/2017-6/2018. Many-core search structures.
 - Garrett Morrison, 1/2017-6/2018. Visualization on the Xeon Phi.
- B.S. students
 - Jeremy Brennan, 6/2016-12/2017. Visualization on the Xeon Phi.

Past Student Advising

- Ph.D. dissertation advising
 - Matthew Larsen, November 2016
Dissertation title: “Performance Modeling of In Situ Rendering”
Upon graduation: Technical Staff, Lawrence Livermore National Laboratory
 - David Camp, August 2012
Dissertation title: “Parallel Particle Advection: Techniques and Applications”
Upon graduation: Technical Staff, Lawrence Berkeley National Laboratory
Note: Ken Joy served as the advisor of record
- M.S. thesis advising
 - Areej Alghamdi, March 2017
Thesis title: “An Algorithm for Clipping Polygons of Large Geographical Data”
- B.S. thesis advising
 - Ouermi Timbwaoga Aiume Judicael, June 2016
Thesis title: “Evaluating Spatiotemporal Search Structures for Lagrangian Basis Flows”
Upon graduation: enrolled as Ph.D. student at the University of Utah
 - Shawn Sadler, June 2016
Thesis title: “Photorealistic Rendering Utilizing Close-Range Photogrammetry”
Upon graduation: enrolled as M.S. student at the University of Oregon
 - Kevin Beick, December 2014
Thesis title: “Analyzing Performance of Bounding Volume Hierarchies for Ray-Tracing”
 - Brenda Griggs, June 2014
Thesis title: “The End of the Rainbow? An Exploration of Color in Scientific Visualization”
- Committee member for Ph.D. dissertations
 - Nick Chaimov (CIS, University of Oregon), June 2017
 - Dan Ellsworth (CIS, University of Oregon), June 2017
 - Max Kutler (Math, University of Oregon), May 2017
 - David Ozog (CIS, University of Oregon), December 2016
 - Alexy Agranovsky (CS, UC Davis), December 2014
- Additional research advising (non-thesis)
 - Alister Maguire, B.S. student, June 2016–June 2017.
Project #1: Visualization on the Xeon Phi
Project #2: Many-core acceleration of VisIt volume renderer
Outcomes: position at Lawrence Livermore on VisIt team

- Kirsten Dawes, B.S. student, June 2014-July 2016
Project: Visualization on the Intel Xeon Phi
Outcomes: software development accepted into repository for major open source project (VisIt)
Upon graduation: enrolled as Ph.D. student at the University of Tennessee, Knoxville
- Jordan Weiler, M.S. student, September 2013-June 2014
Project: Efficient calculation of connected components
Outcomes: co-author on publication #25

Professional Service

- Notable Chair service
 - IEEE Visualization
 - SciVis Doctoral Colloquium Chair for VIS17, Phoenix, AZ.
 - IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV)
 - Overall Co-Chair for LDAV16, Baltimore, MD.
 - Program Co-Chair for LDAV15, Chicago, IL.
 - Program Co-Chair for LDAV14, Paris, France.
 - ACM/IEEE SuperComputing (SC)
 - Tutorials Chair for SC17, Denver, CO.
 - Visualization Showcase Co-Chair for SC14, New Orleans, LA.
 - Track Chair for Technical Papers on Storage, Analytics, and Visualization at SC12, Salt Lake City, UT.
 - EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)
 - Program Co-Chair for EGPGV12, Sardinia, Italy.
 - Department of Energy Computer Graphics Forum (DOECGF)
 - Site Chair for DOECGF13, Portland, OR.
 - Program Chair for DOECGF09, Monterey, CA.
- Additional Chair service
 - ACM/IEEE SuperComputing (SC) Birds of a Feather Area Chair (Data Analytics, Visualization, and Storage), November 2016.
 - Posters Co-Chair, International Conference on Supercomputing (ICS), Eugene, OR, June 2013.
 - Student Research Competition Co-Chair, International Conference on Supercomputing (ICS), Eugene, OR, June 2013.
 - Publicity Co-Chair, IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV), Providence, RI, October 2011.
- Organizing committee
 - SIAM Computational Science and Engineering (CSE), Salt Lake City, UT, February 2015.
 - Scientific Discovery through Advance Computing (SciDAC) Conference, San Diego, CA, June 2009.
- Steering committee
 - Department of Energy Computer Graphics Forum (DOECGF), 2013-
 - EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV), 2011-
- Journal guest editor
 - “Visualization and Data Analytics for Scientific Discovery,” H. Childs and F. Cappello, Parallel Computing, Volume 55, July 2016.
- Organization of conference events (panels, mini-symposia, and tutorials)
 - Organized Birds-of-a-Feather “Planning for Visualization on the Xeon Phi” at ACM/IEEE Supercomputing (SC), Austin, TX, November 2015.
 - Organized panel “In Situ 2020: Predictions for the Future of In Situ Processing” (along with Kelly Gaither) at IEEE Large Data Analysis and Visualization (LDAV), Chicago, IL, October 2015.

- Organized panel “Ask the Program Manager: Funding” at SIAM Computational Science and Engineering (CSE15), Salt Lake City, UT, March 2015.
- Organized panel “Research Challenges for Scientific Visualization Software” at IEEE Visualization, Atlanta, GA, October 2013.
- Organized panel “Visualization Frameworks for Multi-Core and Many-Core Architectures” at ACM/IEEE SuperComputing (SC), Salt Lake City, UT, November 2012.
- Organized mini-symposium “The Challenges Ahead for Visualizing and Analyzing Massive Data Sets,” at SIAM Conference on Parallel Processing for Scientific Computing (PP10), Seattle, WA, February 2010.
- Co-organizer of “Vis Night,” Scientific Discovery through Advance Computing (SciDAC) Conference, San Diego, CA, June 2009.
- Organizer or co-organizer of tutorials Tu1, Tu2, Tu8, Tu9, Tu10, Tu11, Tu12, Tu13, Tu14, Tu15, and Tu16. (*These tutorials are listed in the teaching section of the vita.*)
- Conference program committee service
 - ACM/IEEE SuperComputing (SC)
 - Technical Program Committee 2012, 2014, 2015
 - Tutorials Committee 2016
 - Workshops held in conjunction with SC
 - Workshop on Ultrascale Visualization (Ultravis) 2012, 2013
 - Workshop on Visual Performance Analysis (VPA) 2014-2016
 - Workshop on In Situ Analysis and Visualization (ISAV) 2016
 - IEEE Visualization (VIS)
 - Scientific Visualization 2013-2015, 2017
 - Symposium on Large-Scale Data Analysis and Visualization (LDAV) 2011, 2012, 2017
 - Scientific Discovery through Advanced Computing (SciDAC) Conference 2009
 - IEEE Cluster 2015, 2017
 - EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV) 2011, 2013-2017
 - IEEE Pacific Visualization Symposium 2015-2017
 - SPIE Visualization and Data Analysis (VDA) 2014-2017
- Advisory roles
 - Argonne Leadership Computing Facility (ALCF) User Advisory Council, 2011-2013
 - NSF Blue Waters Visualization Advisory Panel, 2009-2011
- Grant panel service
 - NSF Panel, Division of Advanced Cyberinfrastructure (ACI), 2014
 - NSF Panel, Division of Information and Intelligent Systems (IIS), 2013, 2015
 - DOE Small Business Innovation Research (SBIR) Program 2011, 2012
- Grant external reviewer (“mail in reviewer”) service
 - DOE Exascale Computing Program 2016
 - DOE Small Business Innovation Research (SBIR) Program 2013 (Spring and Fall), 2015, 2016
 - DOE Office of Advanced Scientific Computing Research 2015, 2016, 2017
 - NSF Computer & Information Science & Engineering 2012, 2014, 2015, 2017
 - NSF Directorate for Geosciences 2014
 - G8 Research Councils Initiative on Multilateral Research Funding 2011
- Journal, conference, and book chapter referee service
(includes reviews from program committee roles)
 - ACM/IEEE SuperComputing (SC)
 - Technical Papers: 2011, 2014, 2015
 - Workshops
 - International Workshop on Ultrascale Visualization (Ultravis) 2012, 2013
 - Workshop on Visual Performance Analysis (VPA) 2014-2016

- Workshop on In Situ Analysis and Visualization (ISAV) 2016
- Computer Graphics Forum (CGF) 2016, 2017
- EuroGraphics Conference (EG) 2012, 2017
- EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV) 2011, 2013-2017
- EuroVis 2010, 2011, 2014, 2016
- IEEE Cluster 2015
- IEEE Computer Graphics and Applications 2009, 2011, 2013
- IEEE Pacific Visualization 2012, 2013, 2015-2017
- IEEE Visualization 2009, 2011-2015, 2017
- IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV) 2011, 2012
- IEEE Transactions on Parallel and Distributed Systems (TPDS) 2011
- IEEE Transactions on Visualization and Computer Graphics (TVCG) 2013-2016
- Pacific Graphics 2012, 2015
- Parallel Computing (PARCO) 2014
- SPIE Visualization and Data Analysis (VDA) 2014-2017
- Topological and Statistical Methods for Complex Data (Textbook by Springer) 2014
- Other referee service
 - ACM Richard Tapia Celebration of Diversity in Computing 2014
 - ACM/IEEE SuperComputing Visualization Showcase 2013
 - ACM/IEEE SuperComputing Student Cluster Competition (SCC) 2009 (Judge)

Institutional Service

- University service
 - Graduate Council: 2015-2016
 - High Performance Computing Creation Committee: 2015-2016
- Department service
 - Graduate Education Committee: Spring 2013, 2013-2014, 2014-2015, Summer 2016 (Chair), 2016-2017 (Chair)
 - Recruiting Committee: Summer 2013, 2013-2014, Summer 2014
 - Computing Resources Committee: 2014-2015, 2015-2016 (Chair)
 - Space Committee: 2015-2016

References

Available upon request