

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, September 2015-present
 - Assistant Professor, March 2013-September 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

- Funding awards totaling over \$4M (PI share) at the University of Oregon, 2013-present.
- University of Oregon Faculty Excellence Award in 2018 (\$20K). One of 15 awards campus-wide.
- CIS Department Award for Best Teacher (selected by students) for 2015, 2016, 2017, and 2019.
- 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 (6), Finalists (1), and Honorable Mentions (1)
 - Best Paper Honorable Mention: “A Lifeline-Based Approach for Work Requesting and Parallel Particle Advection.” At the IEEE Symposium on Large Data Visualization and Analysis (LDAV) 2019.
 - Best Paper Award: “A Flexible System for In Situ Triggers.” At the Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV) 2018.
 - 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.

Books

1. 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, Oct. 2012. In addition to editor role, Childs authored four chapters in the book and was a co-author on a fifth.

Peer-Reviewed Journal Articles

2. B. Lessley and H. Childs. Data-Parallel Hashing Techniques for GPU Architectures. *IEEE Transactions on Parallel and Distributed Systems (TPDS)*, 31(1):237–250, Jan. 2020.
3. H. Childs, J. Bennett, C. Garth, and B. Hentschel. In Situ Visualization for Computational Science. *IEEE Computer Graphics and Applications (CG&A)*, 39(6):76–85, Nov./Dec. 2019.
4. R. Binyahib, T. Peterka, M. Larsen, K.-L. Ma, and H. Childs. A Scalable Hybrid Scheme for Ray-Casting of Unstructured Volume Data. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 25(7):2349–2361, July 2019.
5. S. Li, N. Marsaglia, C. Garth, J. Woodring, J. Clyne, and H. Childs. Data Reduction Techniques for Simulation, Visualization and Data Analysis. *Computer Graphics Forum (CGF)*, 37(6):422–447, Sept. 2018.
6. 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.
7. 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 (CGF)*, 35(3):577–597, June 2016.
8. 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.
9. H. Childs. Data Exploration at the Exascale. *Supercomputing Frontiers and Innovations*, 2(3):5–13, Dec. 2015.
10. K. Moreland, M. Larsen, and H. Childs. Visualization for Exascale: Portable Performance Is Critical. *Supercomputing Frontiers and Innovations*, 2(3):67–75, Dec. 2015.
11. 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.
12. 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.
13. 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.

14. 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.
15. 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.
16. 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.
17. 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.
18. 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.
19. 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.
20. 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(11):1702–1713, Nov. 2011.
21. 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.
22. J. S. Meredith and H. Childs. Visualization and Analysis-Oriented Reconstruction of Material Interfaces. *Computer Graphics Forum (CGF)*, 29(3):1241–1250, June 2010.
23. 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.
24. 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.
25. 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.

Peer-Reviewed Full Papers in Conference and Symposium Proceedings

26. B. Lessley, S. Li, and H. Childs. HashFight: A Platform-Portable Hash Table for Multi-Core and Many-Core Architectures. In *Electronic Imaging: Visualization and Data Analysis (VDA)*, pages VDA–376–1 – VDA–376–10, Burlingame, CA, Jan. 2020
27. R. Binyahib, D. Pugmire, B. Norris, and H. Childs. A Lifeline-Based Approach for Work Requesting and Parallel Particle Advection. In *IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 52–61, Vancouver, Canada, Oct. 2019. **Best paper honorable mention.**

28. A. Schnorr, D. N. Helmrich, H. Childs, T. W. Kuhlen, and B. Hentschel. Feature Tracking Utilizing a Maximum-Weight Independent Set Problem. In *IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 6–15, Vancouver, Canada, Oct. 2019.
29. A. D. Malony, M. Larsen, K. Huck, C. Wood, S. Sane, and H. Childs. When Parallel Performance Measurement and Analysis Meets In Situ Analytics and Visualization. In *International Conference on Parallel Computing (ParCo)*, pages 521–532, Prague, Czech Republic, Sept. 2019.
30. R. Bleile, P. Brantley, S. Dawson, M. S. McKinley, M. O’Brien, D. Richards, and H. Childs. Thin-Threads: An Approach for History-Based Monte Carlo on GPUs. In *International Conference on High Performance Computing & Simulation (HPCS)*, pages 273–280, Dublin, Ireland, July 2019.
31. J. Kress, M. Larsen, J. Choi, M. Kim, M. Wolf, N. Podhorszki, S. Klasky, H. Childs, and D. Pugmire. Comparing the Efficiency of In Situ Visualization Paradigms at Scale. In *ISC High Performance*, pages 99–117, Frankfurt, Germany, June 2019.
32. A. Yenpure, H. Childs, and K. Moreland. Efficient Point Merge Using Data Parallel Techniques. In *Eurographics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 79–88, Porto, Portugal, June 2019.
33. S. Sane, H. Childs, and R. Bujack. An Interpolation Scheme for VDVP Lagrangian Basis Flows. In *Eurographics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 109–118, Porto, Portugal, June 2019.
34. S. Labasan, M. Larsen, H. Childs, and B. Rountree. Power and Performance Tradeoffs for Visualization Algorithms. In *Proceedings of IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, pages 325–334, Rio de Janeiro, Brazil, May 2019.
35. B. Lessley, T. Perciano, C. Heinemann, D. Camp, H. Childs, and E. W. Bethel. DPP-PMRF: Rethinking Optimization for a Probabilistic Graphical Model Using Data-Parallel Primitives. In *Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 34–44, Berlin, Germany, Oct. 2018.
36. D. Pugmire, A. Yenpure, M. Kim, J. Kress, R. Maynard, H. Childs, and B. Hentschel. Performance-Portable Particle Advection with VTK-m. In *Eurographics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 45–55, Brno, Czech Republic, June 2018.
37. B. Lessley, T. Perciano, M. Mathai, H. Childs, and E. W. Bethel. Maximal Clique Enumeration with Data-Parallel Primitives. In *Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 16–25, Phoenix, AZ, Oct. 2017.
38. S. Li, S. Sane, L. Orf, P. Mininni, J. Clyne, and H. Childs. Spatiotemporal Wavelet Compression for Visualization of Scientific Simulation Data. In *IEEE International Conference on Cluster Computing (CLUSTER)*, pages 216–227, Honolulu, HI, Sept. 2017.
39. S. Labasan, M. Larsen, H. Childs, and B. Rountree. PaViz: A Power-Adaptive Framework for Optimizing Visualization Performance. In *Proceedings of EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 1–10, Barcelona, Spain, June 2017.
40. S. Li, N. Marsaglia, V. Chen, C. Sewell, J. Clyne, and H. Childs. Achieving Portable Performance for Wavelet Compression Using Data Parallel Primitives. In *Proceedings of EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 73–81, Barcelona, Spain, June 2017.
41. P. S. Brantley, R. C. Bleile, S. A. Dawson, N. A. Gentile, M. S. McKinley, M. J. O’Brien, M. M. Pozulp, D. F. Richards, D. E. Stevens, J. A. Walsh, and H. Childs. LLNL Monte Carlo Transport Research Efforts for Advanced Computing Architectures. In *Proceedings of International Conference on Mathematics & Computational Methods Applied to Nuclear Science & Engineering (M&C 2017)*, pages 1–8, Jeju, Korea, Apr. 2017.

42. R. Bleile, L. Sugiyama, C. Garth, and H. Childs. Accelerating Advection via Approximate Block Exterior Flow Maps. In *Electronic Imaging: Visualization and Data Analysis (VDA)*, pages 140–148, San Francisco, CA, Feb. 2017.
43. 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.**
44. 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.
45. 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.
46. 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.
47. 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.
48. 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.
49. 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.
50. 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.
51. 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.
52. 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.**
53. H. Childs, S. Biersdorff, D. Poliakoff, 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.
54. 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.**
55. 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.

56. 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.
57. 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.
58. 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.**
59. 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.
60. 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.
61. 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.
62. 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. In *Procedia Computer Science, Proceedings of the International Conference on Computational Science (ICCS)*, pages 1757–1764, June 2010.
63. 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**.
64. 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)*, pages 16:1–16:12, Portland, OR, Nov. 2009.
65. 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)*, pages 51:1–51:12, Austin, TX, Nov. 2008.
66. 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.
67. 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.
68. 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.

69. 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.**
70. 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.
71. 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.
72. 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.
73. 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.
74. 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.
75. 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.
76. 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 Book Chapters

77. N. Marsaglia, S. Li, and H. Childs. Enabling Explorative Visualization with Full Temporal Resolution Via In Situ Calculation of Temporal Intervals. In *ISC High Performance 2018 International Workshops*, volume 11203 of *Lecture Notes in Computer Science*, pages 273–293. Springer Publishing, Frankfurt, Germany, June 2018.
78. J. Kress, J. Choi, S. Klasky, M. Churchill, H. Childs, and D. Pugmire. Binning Based Data Reduction for Vector Field Data of a Particle-In-Cell Fusion Simulation. In *ISC High Performance 2018 International Workshops*, volume 11203 of *Lecture Notes in Computer Science*, pages 215–229. Springer Publishing, Frankfurt, Germany, June 2018.
79. 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.
80. 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.
81. 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, Jan. 2006.

Peer-Reviewed Short Papers in Conference and Symposium Proceedings

82. N. Marsaglia, S. Li, K. Belcher, M. Larsen, and H. Childs. Dynamic I/O Budget Reallocation For In Situ Wavelet Compression. In *Eurographics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 1–6, Porto, Portugal, June 2019.
83. S. Sane, R. Bujack, and H. Childs. Revisiting the Evaluation of In Situ Lagrangian Analysis. In *Eurographics Symposium on Parallel Graphics and Visualization (EGPGV)*, pages 63–67, Brno, Czech Republic, June 2018.
84. B. Lessley, K. Moreland, M. Larsen, and H. Childs. Techniques for Data-Parallel Searching for Duplicate Elements. In *Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV)*, pages 1–5, Phoenix, AZ, Oct. 2017.
85. 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.
86. 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.
87. 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.
88. 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.
89. 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.

Peer-Reviewed Papers in Workshop Proceedings

90. R. Binyahib, D. Pugmire, and H. Childs. In Situ Particle Advection Via Parallelizing Over Particles. In *Proceedings of the Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV)*, pages 29–33, Denver, CO, Nov. 2019.
91. M. Larsen, A. Woods, N. Marsaglia, A. Biswas, S. Dutta, C. Harrison, and H. Childs. A Flexible System for In Situ Triggers. In *Proceedings of the Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV)*, pages 1–6, Dallas, TX, Nov. 2018. **Best paper award.**
92. S. Li, M. Larsen, J. Clyne, and H. Childs. Performance Impacts of In Situ Wavelet Compression on Scientific Simulations. In *Proceedings of the Workshop for In Situ Infrastructures of Enabling Extreme-Scale Analysis and Visualization (ISAV)*, pages 37–41, Denver, CO, Nov. 2017.
93. M. Larsen, J. Ahrens, U. Ayachit, E. Brugger, H. Childs, B. Geveci, and C. Harrison. The ALPINE In Situ Infrastructure: Ascending from the Ashes of Strawman. In *Proceedings of the Workshop of In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV)*, pages 42–46, Denver, CO, Nov. 2017.

94. 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 Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV)*, pages 45–50, Salt Lake City, UT, Nov. 2016.
95. 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) Workshop, held in conjunction with IPDPS*, pages 1007–1013, Chicago, IL, May 2016.
96. 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 Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV)*, pages 1–6, Austin, TX, Nov. 2015.
97. 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 Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV)*, pages 30–35, Austin, TX, Nov. 2015.
98. 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.
99. 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)*, Denver, CO, Nov. 2013. Note: per workshop instructions, self-published (in arXiv, as 1309.1796) and then peer-reviewed by WSSSPE program committee after self-publication.
100. 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.
101. 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.
102. 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.
103. 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.

Papers with Peer-Reviewed Abstracts

104. 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.

Seminar/Workshop Summary Reports

105. H. Childs, T. Itoh, M. Krone, and G. Reina. The Moving Target of Visualization Software for an Ever More Complex World. *Shonan Reports*, 145:1–31, Feb. 2019.
106. J. C. Bennett, H. Childs, C. Garth, and B. Hentschel. In Situ Visualization for Computational Science (Dagstuhl Seminar 18271). *Dagstuhl Reports*, 8(7):1–43, July 2018.
107. 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.

Proceedings Edited

108. H. Childs, S. Frey, and J. M. Pereira, editors. *Proceedings of the EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)*, Porto, Portugal, June 2019.
109. H. Childs, F. Cucchietti, and B. Hentschel, editors. *Proceedings of the EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)*, Brno, Czech Republic, June 2018.
110. 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.
111. 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.
112. H. Childs, T. Kuhlen, and F. Marton, editors. *Proceedings of the EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)*, Cagliari, Italy, May 2012.

Non-Refereed Papers

Invited papers (full papers that accompany an invited talk)

113. 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. Rübél, 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.
114. 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.
115. 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 #63.
116. 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.

117. 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. Rübél, 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.
118. 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. Rübél, 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.
119. 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.
120. 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.
121. 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.
122. 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.

Other non-refereed publications

123. 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.
124. 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.
125. 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.
126. 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.

Accepted for Publication

127. G. Reina, H. Childs, K. Matković, K. Bühler, M. Waldner, D. Pugmire, B. Kozlíková, T. Ropinski, P. Ljung, T. Itoh, E. Gröller, and M. Krone. The Moving Target of Visualization Software for an Increasingly Complex World. *Computers & Graphics*, 87:12 – 29, Apr. 2020.
128. J. Kress, M. Larsen, J. Choi, M. Kim, M. Wolf, N. Podhorszki, S. Klasky, H. Childs, and D. Pugmire. Opportunities for Cost Savings with In Transit Visualization. In *ISC High Performance*, Frankfurt, Germany, June 2020.

Software

- VisIt (participant since inception in 2000, project architect 2000-2013)
 - 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.
- VTK-m (participant since inception in 2016)
 - VTK-m is a library for portable performance over many-core architectures. It is a follow-on effort to the popular Visualization ToolKit (VTK), with the “m” indicating many-core support.
 - In collaboration with his students and colleagues, Childs has helped design and implement multiple data parallel primitive-based algorithms in VTK-m, including external facelist calculation, ray tracing, unstructured volume rendering, wavelet compression, point merging, Markov Random Fields for computer vision, maximal clique enumeration, hash tables, mesh quality metrics, and particle advection.
- Ascent (participant since inception in 2017)
 - Ascent is a flyweight library for in situ visualization and analysis, with emphases on minimal memory usage and API, as well as interoperability with external libraries.
 - Ascent has primarily been developed by Ph.D. alumnus Matthew Larsen, starting during his time as a student in the group (with its predecessor name, Strawman), and with the majority of development happening by Larsen after graduation. Childs has advised various student activities in the project. As an individual, Childs’ biggest contribution to Ascent has been developing tutorial materials for the project.

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/Symposiums/Workshops

- 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. 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.
- I6. 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.
- I7. Center for Scalable Application Development (CScADS) Summer Workshop, “Parallel Particle Advection,” Snowbird, Utah, July 2010.
- I8. NSF Workshop on Extreme Scale I/O and Data Analysis, “Petascale I/O Impacts on Visualization,” Austin, TX, March 2010.
- I9. 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.
- I10. Blue Waters Workshop, “Why Petascale Visualization and Analysis Will Change the Rules,” Urbana, IL, October 2008.
- I11. Center for Scalable Application Development (CScADS) Summer Workshop, “Why Petascale Visualization and Analysis Will Change the Rules,” Snowbird, Utah, July 2008.
- I12. Fall Creek Falls Conference, “Why Petascale Visualization and Analysis Will Change the Rules,” Nashville, TN, September 2007.
- I13. Scientific Discovery through Advanced Computing (SciDAC) Conference, “Why Petascale Visualization and Analysis Will Change the Rules,” Boston, MA, June 2007.
- I14. Computational Engineering and Science Conference (CESC), “VisIt: a Flexible Integrated Visualization and Analysis Environment,” Washington DC, April 2007.

Invited Presentations at Universities

- I15. Oregon Health & Science University, “Visualization of Very Large Scientific Data Sets: Progress to Date and the Road Ahead,” Portland, OR, January 2019.
- I16. University of Tennessee, “Exascale Visualization and In Situ Processing,” Knoxville, TN, September 2016.
- I17. University of Arizona, “Exascale Computing, Flow Visualization, and Data Exploration: A Strategy for Achieving All Three,” Tucson, AZ, January 2016.
- I18. Universität Stuttgart, “Exascale Visualization: Get Ready For a Whole New World,” Stuttgart, Germany, September 2015.
- I19. 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.

- I20. Rheinisch-Westfälische Technische Hochschule (RWTH)-Aachen, “Exascale Visualization: A Paradigm Shift and Four Big Challenges,” Aachen, Germany, March 2014.
- I21. Technische Universität Kaiserslautern, “Hybrid Parallelism and Visualization,” Kaiserslautern, Germany, September 2013.
- I22. Oregon State University EECS Colloquium, “Exascale Visualization: Get Ready for a Whole New World,” Corvallis, OR, April 2013.
- I23. UC Berkeley CITRIS Research Exchange Series, “Visualization of Very Large Scientific Simulations,” Berkeley, CA, May 2012.
- I24. University of Maryland, Institute for Advanced Computer Studies (UMIACS), “Exascale Visualization: Get Ready for a Whole New World,” College Park, MD, September 2011.
- I25. Boise State University, “VisIt: Visualization and Analysis for Extreme Scale Data,” Boise, ID, September 2011.
- I26. Louisiana State Colloquium Series, “Overview of the VisIt Project,” Baton Rouge, LA, October 2008.

Invited Presentations at Laboratories

- I27. Commissariat à l’Énergie Atomique (CEA) Direction des Applications Militaires (DAM), “In Situ Visualization and Analysis: Perspectives from a US Department of Energy Practitioner,” Bruyères-le-Châtel, France, November 2018.
- I28. Los Alamos National Laboratory, “In Situ Processing: Instantiations, Opportunities, and Challenges,” Los Alamos, NM, July 2018.
- I29. Oak Ridge National Laboratory, “In Situ Processing: Opportunities, Challenges, and Instantiations,” Oak Ridge, TN, August 2016.
- I30. National Center for Atmospheric Research, “Exascale Visualization: What Will Change,” Boulder, CO, March 2016.
- I31. Intel Corporation, “Exascale Visualization: A Paradigm Shift,” Hillsboro, OR, February 2015.
- I32. Los Alamos National Laboratory, “Exascale Computing, Flow Visualization, and Data Exploration: A Strategy for Achieving All Three,” Los Alamos, NM, September 2014.
- I33. Jülich Research Centre, “Exascale Visualization: A Paradigm Shift and Four Big Challenges,” Jülich, Germany, March 2014.
- I34. Swiss National Supercomputing Centre (CSCS), “Hybrid Parallelism and Visualization,” Lugano, Switzerland, September 2013.
- I35. Pacific Northwest National Laboratory (PNNL), “Exascale Visualization: Get Ready for a Whole New World,” Richland, WA, March 2013.
- I36. National Renewable Energy Laboratory (NREL), “Exascale Visualization: Get Ready for a Whole New World,” Golden, CO, November 2012.
- I37. NASA Ames, “Overview of VisIt,” Mountain View, CA, February 2011.

Invited Seminars/Workshops

- I38. Schloss Dagstuhl Seminar on In Situ Visualization, “The In Situ Terminology Project,” Wadern, Germany, July 2018.
- I39. Schloss Dagstuhl Seminar on Scientific Visualization, “Exascale Computing and Uncertainty Visualization,” Wadern, Germany, June 2014.
- I40. Schloss Dagstuhl Perspectives Workshop on Performance Analysis and Visualization, “Some Inspiration from Scientific Visualization...,” Wadern, Germany, January 2014.

Invited Speaker at Meetings/Events/Webinars

- I41. The Museum of Flight: Boeing Academy for STEM Learning, ‘Your Computer: Just How Powerful Is It, and Is That Enough?,’ Portland, OR, July 2018.

- I42. University of Oregon Society of Physics Students, ‘Your Computer: Just How Powerful Is It, and Is That Enough?,’ Eugene, OR, April 2018.
- I43. OMSI (Oregon Museum of Science and Industry) Science Pub, ‘Your Computer: Just How Powerful Is It, and Is That Enough?,’ Eugene, OR, March 2018.
- I44. Intel Visualization Users Group Meeting, ‘The State of Scientific Visualization with Respect to Many-Core,’ Santa Clara, CA, May 2014.
- I45. Computational Infrastructure for Geodynamics (CIG) Webinar Series, ‘Exascale Visualization: Why Things Will Change for You,’ February 2014.
- I46. Intel’s Open Source Software Innovators Series (webinar), ‘Visualizing Large Complex Data Sets with VisIt,’ June 2013.
- I47. KAUST Visualization Summit, ‘Exascale Visualization: Get Ready for a Whole New World,’ Thuwal, Saudi Arabia, April 2013.
- I48. VINAS (Visual Integration & Numerical Analysis Systems) Corporation Users Meeting, ‘VisIt: Visualizing and Analyzing Very Large Data,’ Tokyo, Japan, October 2012.
- I49. 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.

Current Funding (PI)

- DOE Exascale Computing Program (ECP), ‘ALPINE: Algorithms and Infrastructure for In Situ Visualization and Analysis,’ 10/2019-6/2023. Overall PI: Jim Ahrens, Los Alamos. Overall Deputy PI and Oregon PI: Hank Childs (\$714,960). Other PIs: Eric Brugger (Lawrence Livermore), Berk Geveci (Kitware, Inc.), Gunther Weber (Lawrence Berkeley), David Pugmire (Oak Ridge), Valerio Pascucci (Univ. of Utah), Janine Bennett (Sandia), and Silvio Rizzi (Argonne).
- DOE Exascale Computing Program (ECP), ‘VTK-m: Updating HPC Visualization Software for Exascale-Era Processors,’ 10/2019-6/2023. Overall PI: Ken Moreland, Sandia. Oregon PI: Hank Childs (\$568,768). Other PIs: Berk Geveci (Kitware, Inc.), David Rogers (Los Alamos), and David Pugmire (Oak Ridge).

Previous Funding (PI)

- DOE Exascale Computing Program (ECP), ‘ALPINE: Algorithms and Infrastructure for In Situ Visualization and Analysis,’ 1/2017-9/2019. 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,’ 1/2017-9/2019. 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.
- Intel Parallel Computing Center, ‘VisIt on the Xeon Phi,’ 4/2014-4/2018, \$450,000. Overall PI: Jian Huang, UT-Knoxville. Oregon PI: Hank Childs (\$217,493).
- 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.

- 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.
- NSF SI2, “A Comprehensive Ray Tracing Framework for Visualization in Distributed-Memory Parallel Environments,” 10/2013-9/2016, \$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.
- 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.
- 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

- Kristi Belcher, NSF Graduate Research Fellowship. Awarded April 2017, prior to joining UO.
- 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.
- Roba Binyahib, King Abdullah Scholarship. Awarded June 2014, prior to joining UO.

Current Student Advising

- Currently advising 6 Ph.D. students (3 Ph.D. candidates & 3 pre-candidacy) and one M.S. student
- Ph.D. candidates
 - Sudhanshu Sane, 12/2015-5/2020
 - ▷ Topic: Lagrangian-based flow visualization
 - ▷ Ph.D. publications: first-authored [33,83], co-authored [29,38]
 - Ryan Bleile, 9/2013-6/2020
 - ▷ Topic: Monte Carlo radiation transport on modern HPC architectures
 - ▷ Ph.D. publications: first-authored [30,42,85,86], co-authored [41,79]
 - Nicole Marsaglia, 2/2016-6/2021
 - ▷ Topic: automated visualization
 - ▷ Ph.D. publications: first-authored [77,82], co-authored [5,40,91]
- Ph.D. pre-candidacy students
 - Abhishek Yenpure, 9/2016-6/2021
 - ▷ Topic: flow visualization
 - ▷ Ph.D. publications: first-authored [32], co-authored [36]
 - Steven Walton, 9/2018-6/2023
 - ▷ Topic: in situ visualization and machine learning
 - Samuel Schwartz, 7/2019-6/2024
 - ▷ Topic: scientific visualization and machine learning
- M.S. students
 - Kristi Belcher, M.S. expected 6/2020
 - ▷ Topic: efficient use of many-core devices
 - ▷ M.S. publications: co-authored [82]

Past Student Advising

- Advising totals: 7 Ph.D. dissertations (1 co-advised), 3 M.S. theses, 5 B.S. theses, 4 non-thesis students, 2 visiting researchers, and member of 11 Ph.D. committees.
- Ph.D. dissertations advised
 - Roba Binyahib, March 2020
 - ▷ Dissertation: “Evaluating Parallel Particle Advection Algorithms Over Various Workloads”
 - ▷ Ph.D. publications: first-authored [4,27,90]+2 publications in preparation, co-authored [45]
 - ▷ Awards: Best Paper Honorable Mention at LDAH19, Donald J. Hubbard Family Scholarship
 - ▷ Upon graduation: Post-doctoral Researcher, National Renewable Energy Laboratory
 - James Kress, March 2020
 - ▷ Dissertation: “In-line vs. In-transit In Situ: Which Technique to Use at Scale?”
 - ▷ Ph.D. publications: first-authored [6,31,48,78,94,96,128], co-authored [8,36,43,95]
 - ▷ Upon graduation: Technical Staff, Oak Ridge National Laboratory
 - Stephanie Brink, née Labasan, March 2019
 - ▷ Dissertation: “Optimizing Visualization Performance on Power-Constrained Supercomputers”
 - ▷ Ph.D. publications: first-authored [34,39,46] + publication currently in review, co-authored [49]
 - ▷ Award: Lawrence Graduate Scholar Fellowship
 - ▷ Upon graduation: Technical Staff, Lawrence Livermore National Laboratory
 - Brenton Lessley, February 2019
 - ▷ Dissertation: “Index-Based Search Techniques for Visualization and Data Analysis Algorithms on Many-Core Systems”

- ▷ Ph.D. publications: first-authored [2,26,35,37,45,84]
 - ▷ Upon graduation: Verb Surgical, a joint venture between Google and Johnson&Johnson
- Shaomeng (Samuel) Li, November 2017
 - ▷ Dissertation: “Wavelet Compression for Visualization and Analysis on High Performance Computers”
 - ▷ Ph.D. publications: first-authored [5,38,40,47,52,92]
 - ▷ Awards: Best Paper at VDA15, selected for NCAR Advanced Study Program
 - ▷ Upon graduation: Technical Staff, National Center for Atmospheric Research
 - ▷ Post-Ph.D. collaborations: co-authored [26,77,82]
- Matthew Larsen, November 2016
 - ▷ Dissertation: “Performance Modeling of In Situ Rendering”
 - ▷ Ph.D. publications: first-authored [43,44,49,50,97], co-authored [8,10,46]
 - ▷ Awards: Best Paper Finalist at SC16, Donald J. Hubbard Family Scholarship
 - ▷ Upon graduation: Technical Staff, Lawrence Livermore National Laboratory
 - ▷ Post-Ph.D. collaborations: first-authored [91,93], co-authored [4,29,31,34,39,82,84,92,128]
- David Camp, August 2012
 - ▷ Dissertation: “Parallel Particle Advection: Techniques and Applications”
 - ▷ Ph.D. publications: first-authored [20,57,59], co-authored [113] & two book chapters in [1]
 - ▷ Upon graduation: Technical Staff, Lawrence Berkeley National Laboratory
 - ▷ Post-Ph.D. collaborations: first-authored [55,100], co-authored [35,51,53,54]
 - ▷ Note: co-advised with Ken Joy, UC Davis
- M.S. theses advised
 - Manish Mathai, June 2018
 - ▷ Thesis: “A Tile-Based Approach for Photo-Realistic Volume Rendering”
 - ▷ Upon graduation: Microsoft Corporation
 - Garrett Morrison, June 2018
 - ▷ Thesis: “On the Performance of Line Integral Convolution in a Distributed-Memory Parallel Setting”
 - ▷ Upon graduation: Lawrence Livermore National Laboratory (internship, then staff)
 - Areej Alghamdi, March 2017
 - ▷ Thesis: “An Algorithm for Clipping Polygons of Large Geographical Data”
 - ▷ Upon graduation: National Commercial Bank of Saudi Arabia (AlahliNCB)
- B.S. theses advised
 - Laura Queen, May 2019
 - ▷ Thesis: “Estimating Future Flood Risk in the Columbia River Basin Under Climate Change Using an Ensemble of Hydrologic Simulations”
 - ▷ Recognition: thesis received the highest possible grade — “with distinction” — and went on to receive the Robert D. Clark Award from the Clark Honors College
 - ▷ Upon graduation: enrolled as Ph.D. student at the University of Oxford
 - Ouermi Timbwaoga Aiume Judicael, June 2016
 - ▷ Thesis: “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: “Photorealistic Rendering Utilizing Close-Range Photogrammetry”
 - ▷ Upon graduation: enrolled as M.S. student at the University of Oregon
 - Kevin Beick, December 2014
 - ▷ Thesis: “Analyzing Performance of Bounding Volume Hierarchies for Ray-Tracing”

- ▷ Upon graduation: Revolution Design Group
- Brenda Griggs, June 2014
 - ▷ Thesis: “The End of the Rainbow? An Exploration of Color in Scientific Visualization”
 - ▷ Upon graduation: Shell Federal Credit Union
- Additional research advising (non-thesis)
 - Jeremy Brennan, B.S. student, June 2016-December 2017
 - ▷ Project: Visualization on the Intel Xeon Phi
 - ▷ Outcomes: software development accepted into repository for major open source project (VisIt)
 - ▷ Upon graduation: position at Intel, developing drivers for integrated graphics cards
 - Alister Maguire, B.S. student, June 2016-June 2017
 - ▷ Project #1: Visualization on the Intel Xeon Phi
 - ▷ Project #2: Many-core acceleration of VisIt volume renderer
 - ▷ Outcomes: software development accepted into repository for major open source project (VisIt)
 - ▷ Upon graduation: 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 graduate 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 #79
 - ▷ Upon graduation: Emberex
- Hosting visiting students
 - Andrea Schnorr, Ph.D. student at RWTH-Aachen, September 2018-December 2018.
Publication: #28
 - Valentin Bruder, Ph.D. student at Universität Stuttgart, May 2018-August 2018.
Publications: in progress
- Committee member for Ph.D. dissertations
 - Outside expert
 - Tim Biedert, Technische Universität Kaiserslautern, August 2019
 - Estelle Dirand, Université Grenoble Alpes, November 2018
 - Alexy Agranovsky, University of California at Davis, December 2014
 - University of Oregon: computer science students
 - Mingwei Zhang, June 2019
 - Nicholas Chaimov, June 2017
 - Daniel Ellsworth, June 2017
 - David Ozog, December 2016
 - University of Oregon: institutional representative
 - Ben Heath, Earth Sciences, November 2019
 - Robert Usher, Mathematics, May 2019
 - John Myers, Physics, May 2019
 - Max Kutler, Mathematics, May 2017

University Teaching

- CIS 212: Computer Science III. Fall 2018, Fall 2019.
- CIS 330: Unix, C, and C++. Spring 2014, Spring 2015, Spring 2016, Spring 2017, Spring 2018.
- CIS 410/510: Introduction to Scientific Visualization. Fall 2013, Fall 2015, Winter 2018, Winter 2020.
- CIS 441/541: Introduction to Computer Graphics. Spring 2013, Fall 2014, Fall 2016, Winter 2019.
- CIS 607: Research Seminar.
 - Many-Core Visualization. Spring 2017.
 - In Situ Visualization. Fall 2017.
 - Unix, C, and C++ for Grad Students. Fall 2018 (as 507), Winter 2020.
- CIS 610: Many-Core Visualization Libraries. Winter 2014.
- CIS 610: Visualization and Portable Performance. Fall 2015.
- CIS 640: Writing in Computer Science Research. Fall 2019, Winter 2020.

Extra-Curricular Teaching: Short Courses, Tutorials, and Trainings

- Short courses
 - 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.
 - 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.
- 20 tutorials at conferences (all had peer-reviewed proposals)
 - “In Situ Visualization and Analysis with Ascent” at the Exascale Computing Project (ECP) Annual Meeting, Houston, TX, February 2020. Tutorial organizer and presenter.
 - “In Situ Analysis and Visualization with SENSEI and Ascent” at the International Conference for High Performance Computing, Networking, Storage, and Analysis (SC19), Denver, CO, November 2019. Full day tutorial. Tutorial organizer and co-main presenter.
 - “VTK-m — A ToolKit for Scientific Visualization on Many-Core Processors” at IEEE Visualization, Vancouver, Canada, October 2019. Tutorial organizer and main presenter.
 - “In Situ Visualization and Analysis with Ascent” at the Exascale Computing Project (ECP) Annual Meeting, Houston, TX, January 2019. Tutorial organizer and main presenter.
 - “Scalable HPC Visualization and Data Analysis Using VisIt” at the ACM/IEEE SuperComputing (SC) Conference, Salt Lake City, UT, November 2016. Tutorial presenter.
 - “Effective HPC Visualization and Data Analysis Using VisIt” at the ACM/IEEE SuperComputing (SC) Conference, Austin, TX, November 2015. Tutorial presenter.
 - “Effective HPC Visualization and Data Analysis Using VisIt” at the ACM/IEEE SuperComputing (SC) Conference, Denver, CO, November 2013. Tutorial presenter.

- “Large Scale Visualization and Data Analysis with VisIt” at the ACM/IEEE SuperComputing (SC) Conference, Salt Lake City, UT, November 2012. Tutorial presenter.
 - “Large Scale Data Visualization with VisIt” at International Supercomputing Conference (ISC), Hamburg, Germany, June 2012. Tutorial co-organizer and main co-presenter.
 - “Introduction to VisIt” at the Scientific Discovery through Advanced Computing (SciDAC) Conference, Denver, CO, July 2011. Tutorial organizer and main presenter.
 - “Parallel Visualization for Very Large Data Simulations” at the International Supercomputing Conference (ISC), Hamburg, Germany, June 2011. Tutorial co-organizer and main co-presenter.
 - “Introduction to VisIt: Visualization and Analysis for Very Large Data Sets” at the ACM/IEEE SuperComputing (SC) Conference, New Orleans, LA, November 2010. Tutorial organizer and main presenter.
 - “Advanced VisIt Usage: Visualization and Analysis for Very Large Data Sets” at the ACM/IEEE SuperComputing (SC) Conference, New Orleans, LA, November 2010. Tutorial organizer.
 - “Large Vector-Field Visualization: Theory and Practice” at IEEE Visualization, Salt Lake City, UT, October 2010. Tutorial co-organizer and presenter.
 - “Introduction to VisIt” at the Scientific Discovery through Advanced Computing (SciDAC) Conference, Chattanooga, TN, July 2010. Tutorial organizer and main presenter.
 - “VisIt — Visualization and Analysis for Very Large Data Sets” at the ACM/IEEE SuperComputing (SC) Conference, Portland, OR, November 2009. Tutorial organizer and co-main presenter.
 - “Visualization and Analysis Using VisIt” at IEEE Visualization, Atlantic City, NJ, October 2009. Tutorial organizer and co-main presenter.
 - “Visualization of Time-Varying Vector Fields” at IEEE Visualization, Atlantic City, NJ, October 2009. Tutorial presenter.
 - “Introduction to VisIt” at the Scientific Discovery through Advanced Computing (SciDAC) Conference, San Diego Supercomputing Center, San Diego, CA, June 2009. Tutorial organizer and main presenter.
 - “Advanced Visualization and Data Analysis with the VisIt Visualization System” at the Scientific Discovery through Advanced Computing (SciDAC) Conference, Microsoft Research Center, Seattle, WA, July 2008. Tutorial organizer and main presenter.
- Invited tutorials
 - “ECP Data Analytics & Viz Tools: ALPINE & VTK-m” at the Exascale Computing Project Annual Meeting, Knoxville, TN, February 2018. Tutorial organizer and presenter.
 - “Introduction to VisIt” for the US Army Research Laboratory, Aberdeen, MD, September, 2010. Tutorial organizer and sole presenter.
 - “Introduction to VisIt” at the NERSC Users Group Meeting, hosted by Tech-X Corporation, Boulder, CO, October 2009. Tutorial organizer and sole presenter.
 - “Introduction to VisIt” for Princeton University and Princeton Plasma Physics Laboratory, Princeton, NJ, July 2009. Tutorial organizer and sole presenter.
 - Invited trainings for student audiences
 - Argonne Training Program on Extreme-Scale Computing (ATPESC), “Visualization and Analysis of Massive Data with VisIt,” St. Charles, IL, August 2013.
 - San Diego Supercomputer Center (SDSC) Summer Institute, “Visualization and Analysis with VisIt,” San Diego, CA, August 2012.
 - DOE Advanced Computational Software (ACTS) Workshop, “Visualization and Analysis with VisIt,” Berkeley, CA, August 2011.
 - UC Santa Cruz Visualization Summer Workshop, “Visualization and Analysis with VisIt,” Santa Cruz, CA, July 2011.
 - UC-HiPACC (Univ. of Ca. High-Performance AstroComputing Center) International Summer School on AstroComputing, “Visualization and Analysis with VisIt,” Berkeley, CA, July 2011.
 - Center for Scalable Application Development (CScADS) Summer Workshop, “Visualization and Analysis with VisIt,” Snowbird, Utah, July 2010.

- Center for Scalable Application Development (CScADS) Summer Workshop, “Visualization and Analysis with VisIt,” Lake Tahoe, NV, August 2009.
- DOE Advanced Computational Software (ACTS) Workshop, “Visualization and Analysis with VisIt,” Berkeley, CA, August 2009.
- Center for Scalable Application Development (CScADS) Summer Workshop, “Visualization and Analysis with VisIt,” Snowbird, UT, July 2008.

Professional Service

- Meeting/seminar organization
 - National Institute of Informatics (NII) Shonan Meeting (“The Moving Target of Visualization Software for an Ever More Complex World”), Kanagawa, Japan, February 2019. With T. Itoh, M. Krone, and G. Reina.
 - Schloss Dagstuhl Seminar (“In Situ Visualization for Computational Science”), Wadern, Germany, July 2018. With J. Bennett, C. Garth, and B. Hentschel.
- Advisory positions
 - External Review Team (one of two members), Computer Science and Engineering Program at the University of Nevada, Reno, April 2019.
 - Advisory Board Member, VESTEC (Visual Exploration and Sampling Toolkit for Extreme Computing), a multi-institution project led by the German Aerospace Center (DLR), 2018-2021.
 - User Advisor Council, Argonne Leadership Computing Facility (ALCF), 2011-2013.
 - Advisory Panel, NSF Blue Waters Visualization, 2009-2011.
- Steering committee
 - Department of Energy Computer Graphics Forum (DOECGF), 2013-present.
 - EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV), 2011-present.
 - IEEE Symposium on Large Data Analysis and Visualization (LDAV), 2018-present.
- Editorial positions
 - Associate Editor, IEEE Transactions on Visualization and Computer Graphics (TVCG), 2020-present.
 - Associate Editor, IEEE Transactions on Parallel and Distributed Systems (TPDS), 2017-2020.
 - Guest Editor, Parallel Computing, Volume 55 on “Visualization and Data Analytics for Scientific Discovery,” July 2016. With F. Cappello.
- 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.
 - Publicity Co-Chair for LDAV11, Providence, RI.
 - ACM/IEEE SuperComputing (SC)
 - Tutorials Chair for SC17, Denver, CO.
 - Technical Papers Track Chair (Storage, Analytics, and Visualization) for SC12, Salt Lake City, UT.
 - Visualization Showcase Co-Chair for SC14, New Orleans, LA.
 - Chair for Early Career Program Committee for ISAV19 (co-located workshop), Denver, CO.
 - Birds of a Feather Area Chair (Data Analytics, Visualization, and Storage) for SC16, Salt Lake City, UT.
 - EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV)
 - Program Co-Chair for EGPGV19, Porto, Portugal.

- Program Co-Chair for EGPGV18, Brno, Czech Republic.
 - Program Co-Chair for EGPGV12, Sardinia, Italy.
- International Conference on Supercomputing (ICS)
 - Posters Co-Chair for ICS13, Eugene, OR.
 - Student Research Competition Co-Chair for ICS13, Eugene OR.
- Department of Energy Computer Graphics Forum (DOECGF)
 - Site Chair for DOECGF13, Portland, OR.
 - Program Chair for DOECGF09, Monterey, CA.
- Conference organizing committee
 - ACM/IEEE Supercomputing, Denver, CO, November 2017. (Via Tutorials Chair role.)
 - SIAM Computational Science and Engineering (CSE), Salt Lake City, UT, February 2015.
 - Scientific Discovery through Advance Computing (SciDAC) Conference, San Diego, CA, June 2009.
- Organization of conference events (panels, mini-symposia, and tutorials)
 - Organizer or co-organizer of 19 tutorials (listed in the extra-curricular teaching section of the vita).
 - 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.
- Grant reviews
 - Panelist
 - NSF Panel, Division of Advanced Cyberinfrastructure (ACI), 2014
 - NSF Panel, Division of Information and Intelligent Systems (IIS), 2013, 2015, 2016, 2018
 - DOE Small Business Innovation Research (SBIR) Program 2011, 2012
 - External reviewer (“mail in reviewer”)
 - DOE Exascale Computing Program 2016
 - DOE Small Business Innovation Research (SBIR) Program 2013 (Spring and Fall), 2015, 2016, 2018, 2019 (x4)
 - DOE Office of Advanced Scientific Computing Research 2015, 2016, 2017
 - NSF Computer & Information Science & Engineering 2012, 2014, 2015, 2017, 2018
 - NSF Directorate for Geosciences 2014
 - G8 Research Councils Initiative on Multilateral Research Funding 2011
 - King Abdullah University of Science and Technology (KAUST), Competitive Research Grants (CRG) 2019
- Technical paper reviews
 - Technical program committee for over 40 conferences
 - ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC) 2012, 2014, 2015

- ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC) Co-Located Workshops
 - Workshop on Ultrascale Visualization (Ultravis) 2012, 2013
 - Workshop on Visual Performance Analysis (VPA) 2014-2016
 - Workshop on In Situ Analysis and Visualization (ISAV) 2016-2019
- EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV) 2011, 2013-2017
- EuroVis VisGap Workshop 2020
- IEEE Cluster 2015, 2017
- IEEE Pacific Visualization Symposium 2015-2017
- IEEE Visualization (VIS)
 - Scientific Visualization 2013-2015, 2017, 2019
 - Scientific Visualization Short Papers 2018
 - Symposium on Large-Scale Data Analysis and Visualization (LDAV) 2011, 2012, 2017, 2018
- ISC Workshop on In Situ Visualization (WOIV) 2018-2020
- Scientific Discovery through Advanced Computing (SciDAC) Conference 2009
- SPIE Visualization and Data Analysis (VDA) 2014-2017, 2020
- Over 30 additional reviews for journals, conferences, and book chapters
 - ACM/IEEE SuperComputing (SC) 2011
 - Computer Graphics Forum (CGF) 2016, 2017
 - EuroGraphics Conference (EG) 2012, 2017
 - EuroVis 2010, 2011, 2014, 2016, 2019
 - IEEE Computer Graphics and Applications 2009, 2011, 2013
 - IEEE Pacific Visualization 2012, 2013, 2019, 2020
 - IEEE Visualization 2009, 2011, 2012
 - IEEE Transactions on Parallel and Distributed Systems (TPDS) 2011
 - IEEE Transactions on Visualization and Computer Graphics (TVCG) 2013-2016, 2018, 2019
 - Pacific Graphics 2012, 2015
 - Parallel Computing (PARCO) 2014
 - Topological and Statistical Methods for Complex Data (textbook by Springer) 2014
- Additional service
 - Program committee service not involving reviewing technical papers
 - Tutorials Committee SC16
 - Visualization Showcase Committee SC13
 - Student Cluster Competition SC09 (judge)
 - Reviewer, ACM Richard Tapia Celebration of Diversity in Computing 2014

Institutional Service

- University service
 - Search Committee for Director of UO-OHSU Biomedical Data Science Institute 2019-2020
 - Graduate Council 2015-2016
 - High Performance Computing Creation Committee 2015-2016
- Department service
 - Computing Resources Committee
 - * Committee Chair 2015-2016
 - * Member 2014-2015
 - Curriculum Committee 2017-2018, 2018-2019
 - Graduate Education Committee
 - * Director of Graduate Studies (Committee Chair) 2016-2017, 2017-2018, 2018-2019
 - * Member Spring 2013, 2013-2014, 2014-2015, 2019-2020

- Personnel Committee 2019-2020
- Recruiting Committee 2013-2014
- Space Committee 2015-2016