Michael E. Papka

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RESEARCH and PROFESSIONAL EXPERIENCE

University of Illinois Chicago (2022 – Present)

- **Professor**, Department of Computer Science (2022 – Present), *Tenured faculty member engaged in research and instruction. Member of the Electronic Visualization Laboratory.*

Argonne National Laboratory (1992 – Present)

- **Division Director**, Argonne Leadership Computing Facility (2010 – Present), *Responsible for planning and executing facility upgrades (in collaboration with the project director) and integrated data strategies, risk assessment and management, operations reporting and reviews, staff promotion and retention, and safety. The ALCF is home to some of the world's fastest supercomputers:* **Theta**; *a Cray XC40 supercomputer based on Intel's Xeon Phi KNL processor and NVIDIA DGX-3,* **Polaris**; *a HPE Apollo 6500 Gen10+ based on AMD Milan processor and NVIDIA A100s, and* **Aurora**; *a Intel CPU/GPU system currently being installed that support scientific and engineering open science research.*

- **Deputy Associate Laboratory Director**, Computing, Environment and Life Sciences (CELS) Directorate (2006 – Present), *Provides strategic planning and management of the Laboratory Directorate comprising Biosciences, Computational Science, Data Science and Learning, Environmental Sciences, Mathematics and Computer Science, a joint institute with Northwestern University, and the Argonne Leadership Computing Facility. Aids in executing a research program that aims to couple computing-related activities with several science domains whose future is tied to progress in computing.*

- **Research Scientist** (1992 – Present), *Active research activities in high performance computing, scientific visualization of large datasets and complex datasets, information visualization related to high-performance computing, virtual reality for science and the integration of edge services.*
    - Senior Scientist - RD6 (2012 – Present)
    - Scientist - RD5 (2004 – 2012)
    - Scientist - RD4 (2001 – 2004)
    - Scientist - RD3 (2000 – 2001)
    - Assistant Scientist - RD2 (1996 – 2000)
    - Scientist Associate - RD1 (1992 – 1996)

University of Chicago (1999 – Present)

- **Senior Scientist at Large**, The University of Chicago Consortium for Advanced Science and Engineering (CASE) (2018 – Present), *Member of an organization focused on facilitating research collaborations between faculty at UChicago and scientists and scholars at other institutions, including Argonne, Fermilab, and Marine Biological Laboratory.*

- **Senior Fellow**, Computation Institute, a joint institute of the University of Chicago and Argonne National Laboratory, *Member of a multi-disciplinary research center that worked to advance complex, system-level scientific problems using a wide range of computational approaches and computing platforms.*

• Senior Fellow (2004 – 2018) • Fellow (1999 – 2004)

Illinois Institute of Technology (2021 – Present)

- **Research Professor**, Department of Computer Science (2021 – Present), *Co-supervisor of graduate students in the area of high performance computing.*

Northern Illinois University (2012 – 2022)

- **Presidential Research, Scholarship and Artistry Professor**, Department of Computer Science, *Tenured faculty member engaged in research and instruction. Founded the Data, Devices, and Interaction Laboratory (ddiLab) in 2012 as a new university resource to support a range of computer science research projects. The lab is designed to help students investigate how computing can be used to support and enhance knowledge and discovery.*
    - PRSA Professor (2020 – 2022) • Associate Professor with tenure (2015 – 2017)
    - Professor (2017 – 2020) • Associate Professor (2012 – 2015)

EDUCATION

- **Ph.D. in Computer Science** (2009)
  Physical Sciences Division, The University of Chicago, Chicago, IL
  Dissertation: *Visualization and Collaboration Technologies to Support High-Performance Computing Research*
  Committee: Rick Stevens (Advisor), Todd Dupont, Ian Foster, Mark Hereld, and Ewing Lusk

- **Master of Science in Computer Science** (2002)
  Physical Sciences Division, The University of Chicago, Chicago, IL
  Thesis: *Development and Analysis of a Movie Playback Tool for Use in Tiled Display Environments*
  Advisor: Rick Stevens

- **Master of Science in Electrical Engineering and Computer Science** (1994)
  College of Engineering, University of Illinois at Chicago, Chicago, IL
  Thesis: *Extending Genetic Programming for Discrete Volume Visualization*
  Committee: Thomas A. DeFanti (Advisor), Tom Moher, and Daniel J. Sandin

- **Graduate coursework in Physics** (1990 – 1991)
  College of Liberal Arts and Sciences, Northern Illinois University, DeKalb, IL

- **Bachelor of Science in Physics** (1990)
  College of Liberal Arts and Sciences, Northern Illinois University, DeKalb, IL

Executive Education

- **Alumnus** (2013)
  Harvard Business School, Harvard University, Cambridge, MA
  General Management Program

- **Participant** (2012)
  The University of Chicago Booth School of Business, Chicago, IL
  Executive Education Course: Essentials of Effective Management: The Psychology of Management

- **Participant** (2012)
  Hasso Plattner Institute of Design, Stanford University, Stanford, CA
  Design Thinking Boot Camp: From Insights to Innovation

- **Participant** (2008 Cohort)
  The University of Chicago Booth School of Business, Chicago, IL
  Argonne's Strategic Laboratory Leadership Program Coursework included: Effective Leadership, Strategic Thinking, Building and Implementing Growth Strategies, and Leading Change and Innovation

Teaching Experience

- Introduction to Virtual Reality - Northern Illinois University (CSCI 490, 680) (Sp2018)

- Big Ideas Lecture - Northern Illinois University (CSCI 600) (Fa2018, Fa2019, Sp2020, Fa2020, Sp2021, Fa2021, Sp2022)

- Data Structures and Algorithms - Northern Illinois University (CSCI 340) (Sp2014, Sp2017, Sp2020, Fa2020, Sp2021, Fa2021)

- Data Visualization - Northern Illinois University (CSCI 490, 627) (Fa2012, Fa2013, Sp2015, Sp2016, Sp2019, Sp2022)

- Information Visualization - Northern Illinois University (CSCI 628) (Sp2020)

- Independent Study - iOS Graphics (Su2014) [1 student], Data Visualization (Su2016) [7 students], Data Visualization (Fa2016) [12 students], Game Development (Fa2016) [5 students], Data Visualization (Su2017) [8 students], Virtual Reality (Fa2018)[6 students], Virtual Reality (Fa2020)[1 student], Edge Computing (Sp2021)[1 student], Edge Computing (Fa2021)[1 student]

- Undergraduate Mentoring at Northern Illinois University - (2014–2022) [8 Research Rookies, 3 Simmon Scholars, 1 McKearn Fellow, 1 summer research opportunity program participant and 8 senior capstone projects]

Awards and Honors

- ACM Gordon Bell Special Prize for HPC-Based COVID-19 Research – *GenSLMs: Genome-scale Language Models Reveal SARS-CoV-2 Evolutionary Dynamics* 2022

- Best Paper – *Color Nameability Predicts Inference Accuracy in Spatial Visualizations*, EuroVis'21

- Best Journal Paper (Nominee), IEEE Transactions on Visualization and Computer Graphics – *Real-Time Omnidirectional Stereo Rendering: Generating 360° Surround-View Panoramic Images for Comfortable Immersive Viewing*, IEEE VR 2021 (invited high-impact paper presented at SIGGRAPH 2021)

- The Secretary of Energy Achievement Award - High Performance Computing Resource Team 2021

- 2019 – 2020 Excellence in Teaching Award, Northern Illinois University Department of Computer Science

- Top Recognition for Exemplary Blend of Networking, Computing, and Storage – *Real-Time Analysis of Streaming Synchrotron Data*, The International Conference for High Performance Computing Networking, Storage, and Analysis 2019 SCinet Technology Challenge!

- 2018 HPCwire Outstanding Leadership in HPC - Nominee

- James M. Lufkin Award for Best IPCC Paper – *Improving Models of Document Cycling: Accounting for the Less Visible Writing Activities of an Annual Reporting Process at a Supercomputing Facility*, 2016 IEEE International Professional Communication Conference (IPCC)

- 2016 IEEE Certificate of Appreciation Recipient - co-General Chair IEEE Visualization 2015

- Honorable Mention, Best Paper – *Parallel Distributed, GPU-Accelerated, Advanced Lighting Calculations for Large-Scale Volume Visualization*, 6th IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV 2016)

- 2015 – 2016 Excellence in Teaching Award, Northern Illinois University Department of Computer Science

- Best Poster – *Streaming Ultra High Resolution Images to Large Tiled Display at Nearly Interactive Frame Rates with with vl3*, 5th IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV 2015)

- Best Paper – *Exploring Void Search for Fault Detection on Extreme Scale Systems*, IEEE Cluster 2014

- University of Illinois Alumni Association's UIC City Partner Award, 2014

- Star Leadership Award from Grace McWayne Elementary, 2014 (*established after school technology program for Fourth and Fifth graders*)

- 2013 IEEE Certificate of Appreciation Recipient - co-General Chair IEEE Large Data Analysis Visualization Symposium 2012

- Best Paper – *Scalable in Situ Scientific Data Encoding for Analytical Query Processing*, 22nd International ACM Symposium on High Performance Parallel and Distributed Computing (HPDC'13)

- Best Paper – *Efficient Parallel Volume Rendering of Large-Scale Adaptive Mesh Refinement Data*, 2013 IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV 2013)

- Argonne National Laboratory Pacesetter – *Extraordinary Contribution*, 2012

- ACM Gordon Bell Prize – *A New Computational Paradigm in Multiscale Simulations: Applications to Blood Flow* [Honorable Mention], 2011

- R&D 100 Award – *Access Grid 3.0*, 2007

- SC05 HPC Analytics Challenge – *Real-Time Change Detection and Alerts from Highway Traffic Data*, 2005 International Conference on High Performance Computing, Networking, Storage and Analysis (SC'05)

- Best Panel – *Commodity Graphics Accelerators for Scientific Visualization Panel*, 12th Annual IEEE Visualization Conference (VIS 2001)

PUBLICATIONS

Journals, Books, and Book Chapters [Peer Reviewed]

1. R. Vescovi, R. Chard, N. D. Saint, B. Blaiszik, J. Pruyne, T. Bicer, A. Lavens, Z. Liu, M. E. Papka and S. Narayanan, N. Schwarz, K. Chard, I. T. Foster, *Linking Scientific Instruments and Computation: Patterns, Technologies, and Experiences*, **Patterns**, 3(10), 2022 doi.org/10.1016/j.patter.2022.100606.

2. Y. Fan, B. Li, D. Favorite, N. Singh, T. Childers, P. Rich, W. Allcock, M. E. Papka and Z. Lan, *DRAS: Deep Reinforcement Learning for Cluster Scheduling in High Performance Computing*, **IEEE Transactions on Parallel and Distributed Systems**, 33(12), pp. 4903-4917, 2022.

3. C. Catlett, P. Beckman, N. Ferrier, M. E. Papka, R. Sankaran, J. Solin, V. Taylor, D. Pancoast, D. Reed, *Hands-On Computer Science: The Array of Things Experimental Urban Instrument*, **Computing in Science and Engineering**, 24(1), pp. 57-63, 2022, doi:10.1109/MCSE.2021.3139405.

4. T. Marrinan and M. E. Papka, *Real-Time Omnidirectional Stereo Rendering: Generating 360° Surround-View Panoramic Images for Comfortable Immersive Viewing*, **TVCG Special Issue on the 2021 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)**, 2021. [Nominated for Best Paper]

5. T. Mackoy, B. Kale, M. E. Papka, R. A. Wheeler, *viewSq, a Visual Molecular Dynamics (VMD) module for calculating, analyzing, and visualizing X-ray and neutron structure factors from atomistic simulations*, **Computer Physics Communications**, 264, 2021, doi.org/10.1016/j.cpc.2021.107881.

6. C. Catlett, P. Beckman; N. Ferrier; H. Nusbaum; M. E. Papka; M. G. Berman; R. Sankaran, *Measuring Cities with Software-Defined Sensors*, **Journal of Social Computing**, 1(1), pp. 14-27, September 2020. doi:10.23919/JSC.2020.0003.

7. T. Marrinan, G. Eisenhauer, M. Wolf, J. A. Insley, S. Rizzi, and M. E. Papka, *Parallel Streaming between Heterogeneous HPC Resources for Real-Time Analysis*, **Journal of Computational Science**, 31, pp. 163-171, February 2019, doi:10.1016/j.jocs.2019.01.003.

8. M. R. Fahey, Y. Alexeev, W. Allcock, B. S. Allen, R. Balakrishnan, A. Benali, L. Booker, A. Boyle, L. Briggs, E. Brooks, P. Carns, B. Cerny, A. Cherry, L. Childers, S. Chunduri, R. Coffey, J. Collins, P. Coffman, S. Coghlan, K. DiBennardi, G. Doyle, H. Finkel, G. Fletcher, M. Garcia, I. Goldberg, C. Goletz, S. Gregurich, K. Harms, C. Holohan, J. A. Insley, T. Jackson, J. Jaseckas, E. Jennings, D. Jensen, W. Jiang, M. Kaczmarski, C. Knight, J Knowles, K. Kumaran, T. Leggett, B. Lenard, A. Liu, R. Loy, P. Malakar, A. Mantrala, D. E. Martin, G. Mayorga, G. McPheeters, P. Messina, R. Milner, V. Morozov, Z. Nault, D. Nelson, J. O'Connell, J. Osborn, M. E. Papka, S. Parker, P. Patel, S. Patel, E. Pershey, R. Plzak, A. Pope, J. Punzel, S. Ramprakash, J. Reddy, P. Rich, K. Riley, S. Rizzi, G. Rojas, N. A. Romero, R. Scott, A. Scovel, W. Scullin, E. Shemon, H. Siddabathuni Som, J. Stover, M. Suliba, B. Toonen, T. Uram, A. Vazquez-Mayagoitia, V. Vishwanath, R. D. Waldron, G. West, T. J. Williams, D. Wills, L. Wolf, W. Woods, and M. Zhang, *Theta and Mira at Argonne National Laboratory*, **Contemporary High Performance Computing: From Petascale toward Exascale**, J. S. Vetter, Ed., Chapter 2, Volume 3, CRC Press, 2018.

9. L. Yu, Z. Zhou, Y. Fan, M. E. Papka, and Z. Lan, *System-wide trade-off modeling of performance, power, and resilience on petascale systems*, **The Journal of Supercomputing**, 74, pp. 3168–3192, 2018, doi.org:10.1007/s11227-018-2368-8.

10. M. Kostuk, T. D. Uram, T. Evans, D. M. Orlov, M. E. Papka, D. Schissel, *Automatic Between-Pulse Analysis of DIII-D Experimental Data Performed Remotely on a Supercomputer at Argonne Leadership Computing Facility*, **Fusion Science and Technology**, 2(1), pp. 1-9, 2018.

11. J. T. Childers, T. D. Uram, T. J. LeCompte, M. E. Papka, D. P. Benjamin, *Adapting the Serial Alpgen Parton-Interaction Generator to Simulate LHC Collisions on Millions of Parallel Threads*, **Computer Physics Communications** 210, pp. 54-59, 2016.

12. K. Reda, A. E. Johnson, M. E. Papka, J. Leigh, *Modeling and Evaluating User Behavior in Exploratory Visual Analysis*, **Information Visualization** 15(4), pp. 325-339, October 2016.

13. W. Usher, I. Wald, A. Knoll, M. Papka, V. Pascucci, *In Situ Exploration of Particle Simulations with CPU Ray Tracing*, **Supercomputing Frontiers and Innovations** 3(4), pp. 4-18, October 2016.

14. S. Wallace, Z. Zhou, V. Vishwanath, S. Coghlan, J. Tramm, Z. Lan, M. E. Papka, *Application Power Profiling on IBM Blue Gene/Q*, **Parallel Computing** 57, pp. 73-86, September 2016.

15. P. Perdikaris, J.A. Insley, L. Grinberg, Y. Yu, M. E. Papka, G. E. Karniadakis, *Visualizing Multiphysics, Fluid-Structure Interaction Phenomena in Intracranial Aneurysms*, **Parallel Computing** 55, pp. 9-16, July 2016.

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16. A. Gyulassy, A. Knoll, K. C. Lau, B. Wang, P.-T. Bremer, M. E. Papka, L. Curtiss, V. Pascucci, *Interstitial and Interlayer Ion Diffusion Geometry Extraction in Graphitic Nanosphere Battery Materials*, **IEEE Transactions on Visualization and Computer Graphics** 22(1):916-925, January 2016.

17. H. Bui, E-S. Jung, V. Vishwanath, A. Johnson, J. Leigh, M. E. Papka, *Improving Sparse Data Movement Performance using Multiple Paths on the Blue Gene/Q Supercomputer*, **Parallel Computing** 51, pp. 3-16, January 2016.

18. R. Chard, R. Madduri, N. T. Karonis, K. Chard, K. Duffin, C. E. Ordonez, T. D. Uram, J. Fleischauer, I. T. Foster, M. E. Papka, J. Winans, *Scalable pCT Image Reconstruction Delivered as a Cloud Service*, **IEEE Transactions on Cloud Computing**, doi:10.1109/TCC.2015.2457423, 2015.

19. L. Yu, Z. Zhou, S. Wallace, M. E. Papka, Z. Lan, *Quantitative Modeling of Power Performance Tradeoffs on Extreme Scale Systems*, **Journal of Parallel and Distributed Computing**, 84(C), pp. 1-14, 2015. https://doi.org/10.1016/j.jpdc.2015.06.006

20. V. Vishwanath, H. Bui, M. Hereld, M. E. Papka, *GLEAN*. In **High Performance Parallel I/O**, Prabhat and Quincey Koziol, Eds., Boca Raton: Chapman and Hall/CRC Computational Science, pp. 215-223, 2014.

21. A. Knoll, I. Wald, P. Navratil, A. Bowen, K. Reda, M. E. Papka, K. Gaither, *RBF Volume Ray Casting on Multicore and Manycore CPUs*, **Computer Graphics Forum**, 33(3):71-80, 2014.

22. S. Lakshminarasimhan, X. Zou, D. A. Boyuka II, S. V. Pendse, J. Jenkins, V. Vishwanath, M. E. Papka, S. Klasky, N. F. Samatova, *DIRAQ: Scalable In Situ Data- and Resource-Aware Indexing for Optimized Query Performance*, **Cluster Computing**, 17(63):1-19, 2014.

23. N. T. Karonis, K. L. Duffin, C. E. Ordonez, B. Erdelyi, T. D. Uram, E. C. Olson, G. Coutrakon, M. E. Papka, *Distributed and Hardware Accelerated Computing for Clinical Medical Imaging Using Proton Computed Tomography (pCT)*, **Journal of Parallel and Distributed Computing**, 73(12):1605-1612, 2013.

24. A. Knoll, M. KY Chan, K. C. Lau, B. Liu, J. Greeley, L. Curtiss, M. Hereld, M. E. Papka, *Uncertainty Classification and Visualization of Molecular Interfaces*, **International Journal for Uncertainty Quantification**, 3(2):157-69, 2013.

25. K. Reda, A. Febretti, A. Knoll, J. Aurisano, J. Leigh, A. E. Johnson, M. E. Papka, M. Hereld, *Visualizing Large, Heterogeneous Data in Hybrid-Reality Environments*, **IEEE Computer Graphics and Applications**, 33(4):38-48, 2013.

26. W. E. Allcock, A. M. Bailey, R. Bair, C. Bacon, R. Balakrishnan, A. Bertsch, B. Bihari, B. Carnes, D. Chen, G. Chiu, R. Coffey, S. Coghlan, P. Coteus, K. Cupps, E. W. Draeger, T. W. Fox, L. Fried, M. Gary, J. Glosli, T. Gooding, J. Gunnels, J. Gyllenhaal, J. Hammond, R. Haring, P. Heidelberger, M. Hereld, T. Inglett, K.H. Kim, K. Kumaran, S. Langer, A. Mamidala, R. McCallen, P. Messina, S. Miller, A. Mirin, V. Morozov, F. Najjar, M. Nelson, A. Nichols, M. Ohmacht, M. E. Papka, F. Petrini, T. Quinn, D. Richards, N. A. Romero, K. D. Ryu, A. Schram, R. Shearer, T. Spelce, B. Springmeyer, F. Streitz, B. de Supinski, P. Vranas, B. Walkup, A. Wang, T. Williams, and R. Wisniewski, *Blue Gene/Q: Sequoia and Mira*, In **Contemporary High Performance Computing: From Petascale toward Exascale**, J. S. Vetter, Ed., Boca Raton: Chapman and Hall/CRC Computational Science, 2013, pp. 225-281.

27. G. Bebis, R. Boyle, B. Parvin, D. Koracin, F. Charless, W. Sen, C. Min-Hyung, S. Mantler, J. Schulze, D. Acevedo, K. Mueller, M. E. Papka, Eds., *Advances in Visual Computing - 8th International Symposium, ISVC 2012, Rethymnon, Crete, Greece, July 16-18, 2012, Revised Selected Papers, Part II.*, **Lecture Notes in Computer Science 7432**, Springer 2012.

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28. G. Bebis, R. Boyle, B. Parvin, D. Koracin, F. Charless, W. Sen, C. Min-Hyung, S. Mantler, J. Schulze, D. Acevedo, K. Mueller, M. E. Papka, Eds., *Advances in Visual Computing - 8th International Symposium, ISVC 2012, Rethymnon, Crete, Greece, July 16-18, 2012, Revised Selected Papers, Part I.*, **Lecture Notes in Computer Science 7431**, Springer 2012.

29. L. Grinberg, J. A. Insley, D. Fedosov, V. A. Morozov, M. E. Papka, G. E. Karniadakis, *Tightly Coupled Atomistic-Continuum Simulations of Brain Blood Flow on Petaflop Supercomputers*, **IEEE Computing in Science and Engineering**, 14(6):58-67, 2012.

30. J. Dongarra, P. Beckman, T. Moore, P. Aerts, Gi Aloisio, J-C. Andre, D. Barkai, J-Y. Berthou, T. Boku, B. Braunschweig, F. Cappello, B. Chapman, X. Chi, A. Choudhary, S. Dosanjh, T. Dunning, S. Fiore, A. Geist, B. Gropp, R. Harrison, M. Hereld, M. Heroux, A. Hoisie, K. Hotta, Z. Jin, Y. Ishikawa, F. Johnson, S. Kale, R. Kenway, D. Keyes, B. Kramer, J. Labarta, A. Lichnewsky, T. Lippert, B. Lucas, B. Maccabe, S. Matsuoka, P. Messina, P. Michielse, B. Mohr, M. S. Mueller, W. E. Nagel, H. Nakashima, M. E. Papka, D. Reed, M. Sato, E. Seidel, J. Shalf, D. Skinner, M. Snir, T. Sterling, R. Stevens, F. Streitz, B. Sugar, S. Sumimoto, W. Tang, J. Taylor, R. Thakur, A. Trefethen, M. Valero, A. van der Steen, J. Vetter, P. Williams, R. Wisniewski and K. Yelick, *The International Exascale Software Project Roadmap*, **International Journal of High Performance Computing Applications**, 25(1):3-60, 2011.

31. R. Fisher, L. Kadanoff, D. Lamb, A. Dubey, T. Plewa, A. Calder, F. Cattaneo, P. Constantin, I. Foster, M. E. Papka, S. I. Abarzhi, S. M. Asida, P. M. Rich, C. C. Glendenin, K. Antypas, D. J. Sheeler, L. B. Reid B. Gallagher, and S. G. Needham, *Terascale Turbulence Computation Using the FLASH3 Application Framework on the IBM Blue Gene/L System*, **IBM Journal of Research and Development**, 52(1.2):127-36, 2008.

32. C. Catlett, W. E. Allcock, P. Andrews, R. Aydt, R. Bair, N. Balac, B. Banister, T. Barker, M. Bartelt, P. Beckman, F. Berman, G. GBertoline, A. Blatecky, J. Boisseau, J. Bottum, S. Brunett, J. Bunn, M. Butler, D. Carver, J. Cobb, T. Cockerill, P. F. Couvares, M. Dahan, D. Diehl, T. Dunning, I. Foster, K. Gaither, D. Gannon, S. Goasguen, M. BGrobe, D. Hart, M. Heinzel, C. Hempel, W. Huntoon, J. Insley, C. Jordan, I. Judson, A. Kamrath, N. Karonis, C. Kesselman, P. Kovatch, L. Lane, S.L. Lathrop, M., D. Lifka, L. Liming, M. Livny, R. Loft, D. Marcusiu, J. Marsteller, S. Martin, D. S. McCaulay, J. McGee, L. McGinnis, M. A. McRobbie, P. Messina, R. Moore, J. P. Navarro, J. Nichols, M. E. Papka, R. Pennington, G. Pike, J. Pool, R. Reddy, D. Reed, T. Rimovsky, E. Roberts, R. Roskies, S. Sanielevici, J. R. Scott, A. Shankar, M. Sheddon, M. Showerman, D. Simmel, A. Singer, D. Skow, S. Smallen, W. S. Smith, C., R. Stevens, C. A. Stewart, R. B. Stock, N. Stone, J. Towns, T. Urban, M. Vildibill, E. Walker, V. Welch, N. Wilkins-Diehr, R. Williams, L. Winkler, L. Zhao and A. Zimmerman, *TeraGrid: Analysis of Organization, System Architecture, and Middleware Enabling New Types of Applications*, in **High Performance Computing and Grids in Action**, L. Grandinetti, Ed. IOS Press, Amsterdam, pp. 225-249, 2008.

33. J. A. Insley, M. E. Papka, S. Dong, G. Karniadakis, and N. T. Karonis, *Runtime Visualization of the Human Arterial Tree*, **IEEE Transactions on Visualization and Computer Graphics**, 13(4):810-21, July-August 2007.

34. J. Silverstein, C. Walsh, F. Dech, E. Olson, M. E. Papka, N. Parsad, and R. Stevens. *Immersive Virtual Anatomy Course Using a Cluster of Volume Visualization Machines and Passive Stereo*, **Studies in Health Technology and Informatics**, 125:439-444, 2007.

35. J. Binns, J. DiCarlo, J. A. Insley, T. Leggett, C. Lueninghoener, J.-P. Navarro, M. E. Papka, *Enabling Community Access to TeraGrid Visualization Resources*, **Concurrency and Computation: Practice and Experience**, 19(6):783-94, April 25, 2007.

36. S. Dong, J. Insley, N. Karonis, M. E. Papka, J. Binns, and G. Karniadakis. *Simulating and Visualizing the Human Arterial System on the Teragrid*, **Future Generation Computer Systems**, 22(8):1011-1017, 2006.

37. K. Antypas, A. Calder, A. Dubey, J. Gallagher, J. Joshi, D. Lamb, T. Linde, E. Lusk, O. Messer, A. Mignone, H. Pan, M. E. Papka, F. Peng, T. Plewa, K. Riley, P. Ricker, D. Sheeler, A. Siegel, N. Taylor, J. Truran, N. Vladimirova, G. Weirs, D. Yu, J. Zhang, *Flash: Applications and Future*, **Parallel Computational Fluid Dynamics 2005**, pp. 325-331, Elsevier (2006).

38. K. Keahey, M. E. Papka, Q. Peng, D. Schissel, G. Abla, T. Araki, J. Burruss, E. Feibush, P. Lane, S. Klasky, T. Leggett, D. Mccune, L. Randerson, *Grid Support for Collaborative Control Room in Fusion Science*, **Cluster Computing**, 8(4):305-311, October 2005.

39. J. Binns, F. Dech, M. McCrory, M. E. Papka, J. Silverstein, and R. Stevens. *Developing a Distributed Collaborative Radiological Visualization Application*, **Studies in Health Technology and Informatics**, 112:70-79, 2005.

40. J. Burruss, G. Abla, S. Flanagan, K. Keahey, T. Leggett, C. Ludesche, D. McCune, M. E. Papka, Q. Peng, L. Randerson, and D. Schissel,*Developments in Remote Collaboration and Computation*, **Fusion Science and Technology**, 47(3):814-818, 2005.

41. J. Silverstein, F. Dech, J. Binns, D. Jones, M. E. Papka, and R. Stevens. *Distributed Collaborative Radiological Visualization Using Access Grid*, **Studies in Health Technology and Informatics**, 111:477-481, 2005.

42. W. van Drongelen, H. C. Lee, M. Hereld, D. Jones, M. Cohoon, F. Elsen, M. E. Papka, and R. L. Stevens. *Simulation of neocortical epileptiform activity using parallel computing*, **Neurocomputing**, 58-60:1203-09, June 2004.

43. D. Schissel, J. R. Burruss, A. Finkelstein, S. M. Flanagan, I. T. Foster, T. W. Fredian, M. J. Greenwald, C. R. Johnson, K. Keahey, S. A. Klasky, K. Li, D. C. McCune M. E. Papka, Q. Peng, L. Randerson, A. Sanderson, J. Stellerman, R. Stevens, M. R. Thompson, G. Wallace, *Building the US National Fusion Grid: Results from the National Fusion Collaboratory Project*, **Fusion Engineering and Design**, 71(1):245-250, 2004.

44. N. Karonis, M. E. Papka, J. Binns, J. Bresnahan, J. Insley, D. Jones, and J. Link, *High-Resolution Remote Rendering of Large Datasets in a Collaborative Environment*, **Future Generation of Computer Systems**, 19(6):900-917, 2003.

45. R. Stevens, M. E. Papka, and T. Disz. *Prototyping the Workspaces of the Future*, **IEEE Internet Computing**, 7(4):51-58, July 2003.

46. J. Ahrens, K. Brislawn, K. Martin, B. Geveci, C. C. Law, M. E. Papka, *Large Scale Data Visualization Using Parallel Data Streaming*, **IEEE Computer Graphics & Applications**, 21(4):34-41, 2001.

47. M. E. Papka, R. Stevens, M. Szymanski, *Collaborative Virtual Reality Environments for Computational Science and Design*, **Computer-Aided Design of High-Temperature Materials**, A. Pechenik, R. K. Kalia, P. Vashishta, Eds., Oxford University Press, Inc., 1999.

48. T. DeFanti, I. Foster, M. E. Papka, R. Stevens, and T. Kuhfuss. *Overview of the I-WAY: Wide-Area Visual Supercomputing*, **International Journal of High Performance Computing Applications**, 10(2-3):123-131, 1996.

49. V. Taylor, J. Chen, T. Disz, M. E. Papka, and R. Stevens. *Interactive Virtual Reality in Simulations: Exploring Lag Time*, **IEEE Computational Science and Engineering**, 3(4):46-54, 1996.

50. T. Disz, R. Evard, M. Henderson, W. Nickless, R. Olson, M. E. Papka, and R. Stevens. *Designing the Future of Collaborative Science: Argonne's Futures Laboratory*, **IEEE Parallel and Distributed Technology: Systems and Applications**, 3(2):14-21, June 1995.

Conference and Workshop Proceedings [Peer Reviewed]

1. J. A. Ortiz, J. A. Insley, J. Knowles, V. A. Mateevitsi, M. E. Papka and S. Rizzi, *Massive Data Visualization Techniques for use in Virtual Reality Devices*, **2022 IEEE 12th Symposium on Large Data Analysis and Visualization (LDAV)**, 2022, pp. 1-2, doi: 10.1109/LDAV57265.2022.9966400. [Poster]

2. N. Tishchenko, N. Ferrier, J. A. Insley, V. A. Mateevitsi, M. E. Papka, S. Rizzi and J. Tan, *Toward Bi-directional In Situ Visualization and Analysis of Blood Flow Simulations With Dynamic Deforming Walls*,**2022 IEEE 12th Symposium on Large Data Analysis and Visualization (LDAV)**, 2022, pp. 1-2, doi: 10.1109/LDAV57265.2022.9966389. [Poster]

3. B. Li, Y. Fan, M. Dearing, Z. Lan, P. Rich, W. Allcock and M. E. Papka, *MRSch: Multi-Resource Scheduling for HPC*, **2022 IEEE International Conference on Cluster Computing (CLUSTER)**, 2022, pp. 47-57, doi: 10.1109/CLUSTER51413.2022.00020.

4. Y. Fan, Z. Lan, P. Rich, W. Allcock and M. E. Papka, *Hybrid Workload Scheduling on HPC Systems*, **2022 IEEE International Parallel and Distributed Processing Symposium (IPDPS)**, 2022, pp. 470-480, doi: 10.1109/IPDPS53621.2022.00052.

5. S. Shilpika, B. Lusch, M. Emani, F. Simini, V. Vishwanath, M. E. Papka, and K.-L. Ma, *Toward an In-Depth Analysis of Multifidelity High Performance Computing Systems*, **2022 22nd IEEE International Symposium on Cluster, Cloud and Internet Computing (CCGrid)**, 2022, pp. 716-725, doi: 10.1109/CCGrid54584.2022.00081.

6. R. Lipinski, K. Moreland, M. E. Papka, and T. Marrinan, *GPU-based Image Compression for Efficient Compositing in Distributed Rendering Applications*, **2021 The 11th IEEE Symposium on Large Data Analysis and Visualization in conjunction with IEEE VIS 2021 (LDAV at IEEE VIS 2021)**, New Orleans, LA, October 25, 2021.

7. K. Reda, A. A. Salvi, J. Gray, M. E. Papka, *Color Nameability Predicts Inference Accuracy in Spatial Visualizations*, **Eurographics Conference on Visualization (EuroVis) 2021**, 40 (3), 2021. [Best Paper]

8. Y. Fan, Z. Lan, T. Childers, P. Rich, W. Allcock, M. E. Papka, *Deep Reinforcement Agent for Scheduling in HPC*, **Proceedings of the 35th IEEE International Parallel and Distribued Processing Symposium (IPDPS'21)**, May 2021.

9. P. Chandra, P. Bharti, and M. E. Papka, *A Computer Vision and AI Based Solution to Determine the Change in Water Level in Stream*, **Proceedings of the International Conference for High Performance Computing, Networking, Storage, and Analysis**, Virtual SC'20 Conference, November 16-19, 2020. [POSTER]

10. Z. Liu, R. Lewis, R. Kettimuthu, K. Harms, P. Carns, N. Rao, I. Foster, and M. E. Papka, *Characterization and Identification of HPC Applications at Leadership Computing Facility*, **ICS '20: Proceedings of the 34th ACM International Conference on Supercomputing**, 29, pp. 1-12, June 2020. doi.org/10.1145/3392717.3392774

11. K. Reda and M. E. Papka, *Evaluating Gradient Perception in Color-Coded Scalar Fields*, **2019 IEEE Visualization Conference (VIS)**, Vancouver, BC, Canada, 2019, pp. 271-275. doi: 10.1109/VISUAL.2019.8933760

12. S. Shudler, N. Ferrier, J. A. Insley, M. E. Papka, S. Rizzi, *Spack meets singularity: creating movable in-situ analysis stacks with ease*, **ISAV '19: Proceedings of the Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization**, pp. 34-38, November 2019. https://doi.org/10.1145/3364228.3364682

13. M. Salim, T. Uram, J. T. Childers, V. Vishwanath, M. E. Papka, *Balsam: Near Real-Time Experimental Data Analysis on Supercomputers*, **2019 IEEE/ACM 1st Annual Workshop on Large-scale Experiment-in-the-Loop Computing (XLOOP)**, pp. 26-31, 2019.

14. S. Shudler, N. Ferrier, J. A. Insley, M. E. Papka, S. Patel, and S. Rizzi, *Fast Mesh Validation in Combustion Simulations through In-Situ Visualization*, **EGPGV19: Eurographics Symposium on Parallel Graphics and Visualization**, Porto, Portugal, June 3-4, 2019. doi: 10.2312/pgv.20191105

15. T. Marrinan, S. Rizzi, J. A. Insley, L. Long, L. Renambot, M. E. Papka, *PxStream: Remote Visualization for Distributed Rendering Frameworks*, **2019 The 9th IEEE Symposium on Large Data Analysis and Visualization (LDAV)**, pp. 37-41, 2019.

16. F. Shilpika, B. Lusch, M. Emani, V. Vishwanath, M. E. Papka, K-L. Ma, *MELA: A Visual Analytics Tool for Studying Multifidelity HPC System Logs*, **2019 IEEE/ACM Industry/University Joint International Workshop on Data-center Automation, Analytics, and Control (DAAC)**, pp. 13-18, 2019.

17. A. Sanderson, J. Schmidt, A. Humphrey, M. E. Papka, R. Sisneros, *In Situ Visualization of Performance Metrics in Multiple Domains*, **2019 IEEE/ACM International Workshop on Programming and Performance Visualization Tools (ProTools)**, Denver, CO, November 17, 2019, pp. 62-69, 2019.

18. T. Mackoy, B. Kale, M. E. Papka, and R. Wheeler, *viewSq: VMD module for visualizing and quantifying periodic atomic ordering underlying static structure factors from molecular dynamics simulations*, **Abstracts of Papers of the American Chemical Society**, 258, August 25, 2019.

19. W. E. Allcock, B. S. Allen, R. Ananthakrishnan, B. Blaiszik, K. Chard, R. Chard, I. Foster, L. Lacinski, M. E. Papka, R. Wagner, *Petrel: A Programmatically Accessible Research Data Service*, **PEARC '19 Proceedings of the Practice and Experience in Advanced Research Computing on Rise of the Machines**, doi:10.1145/3332186.3332241, Chicago, IL, August 1, 2019.

20. Y. Fan, Z. Lan, P. Rich, W. E. Allcock, M. E. Papka, B. Austin, D. Paul, *Scheduling Beyond CPUs for HPC*, **Proceedings of the 28th International Symposium on High-Performance Parallel and Distributed Computing**, Phoenix, AZ, June 22, 2019, pp. 97-108. doi:10.1145/3307681.3325401

21. P. Malakar, T. Munson, C. Knight, V. Vishwanath, M. E Papka, *Topology-Aware Space-Shared co-Analysis of Large-Scale Molecular Dynamics Simulations*, **Proceedings of the International Conference for High Performance Computing, Networking, Storage, and Analysis**, Article No. 24, Dallas, TX, November 11, 2018.

22. W. Usher, S. Rizzi, I. Wald, J. Amstutz, J. Insley, V. Vishwanath, N. Ferrier, M. E. Papka, V. Pascucci, *libIS: A Lightweight Library for Flexible in Transit Visualization*, **Proceedings of the Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization**, pp. 33-38, Dallas, TX, November 11, 2018.

23. W. Allcock, B. Bernardoni, C. Bertoni, N. Getty, J. Insley, M. E. Papka, S. Rizzi, B. Toonen, *RAM as a Network Managed Resource*, **2018 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)**, pp. 199-106, Vancouver, Canada, May 21, 2018.

24. T. Marrinan, S. Rizzi, J. Insley, B. Toonen, W. Allcock, M. E. Papka, *Transferring Data from High-Performance Simulations to Extreme Scale Analysis Applications in Real-Time*, **2018 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)**, pp. 1214-1220, Vancouver, Canada, May 21, 2018.

25. P Malakar, C. Knight, T. Munson, V. Vishwanath, M. E. Papka, *Scalable In Situ Analysis of Molecular Dynamics Simulations*, **Proceedings of the In Situ Infrastructures on Enabling Extreme-Scale Analysis and Visualization (ISAV'17)**, pp. 1-6, Denver, CO, November 12, 2017.

26. J. T. Childers, T. D. Uram, D. Benjamin, T. J. LeCompte, M. E. Papka, *An Edge Service for Managing HPC Workflows*, **Proceedings of the Fourth International Workshop on HPC User Support Tools (HUST'17)**, Article No. 1, Denver, CO, November 12, 2017.

27. E. B. Brooks, J. A. Insley, M. E. Papka, S. Rizzi, *Virtual reality tools for the correction of automated volume segmentation errors using dense surface reconstructions*, **2017 IEEE 7th Symposium on Large Data Analysis and Visualization (LDAV)**, pp. 92-93, October 2, 2017. [POSTER]

28. T. Fujiwara, P. Malakar, K. Reda, V. Vishwanath, M. E. Papka, K-L Ma, *A Visual Analytics System for Optimizing Communications in Massively Parallel Applications*, **2017 IEEE Conference on Visual Analytics Science and Technology (VAST)**, Phoenix, AZ, October 1-6, 2017.

29. B. Kale and M. E. Papka, *Visualizing the Scholarly Output of a Research Facility*, **2017 IEEE Conference on Information Visualization (InfoVis)**, Phoenix, AZ, October 1-6, 2017. [POSTER]

30. Y. Fan, P. Rich, W. E. Allcock, M. E. Papka, Z. Lan, *Trade-Off Between Prediction Accuracy and Underestimation Rate in Job Runtime Estimates*, **2017 IEEE International Conference on Cluster Computing (CLUSTER)**, pp. 530-540, Honolulu, HI, September 5, 2017.

31. S. Read, M. E. Papka, *Operational metrics reporting processes at scientific user facilities: Comparing a high-energy x-ray synchrotron facility to a supercomputing facility*, **2017 IEEE International Professional Communication Conference (ProComm)**, pp. 1-6, Madison, WI, July 23, 2017.

32. B. Kale, H. V. Siravuri, H. Alhoori, M. E. Papka, *Predicting Research that will Cited in Policy Documents*, **Proceedings of the 2017 ACM on Web Science Conference (WebSci '17)**, pp. 389-390, Troy, NY, June 25-28, 2017.

33. C. Bailey, B. Kale, J. Walker, H. V. Siravuri, H. Alhoori, M. E. Papka, *Exploring Features for Predicting Policy Citations*, **2017 ACM/IEEE Joint Conference on Digital Libraries (JCDL)**, pp. 1-2, Toronto, Canada, June 19, 2017. [POSTER]

34. T. Marrinan, J. A. Insley, S. Rizzi, F. Tessier, M. E. Papka, *Automated Dynamic Data Redistribution*, **2017 IEEE Parallel and Distributed Processing Symposium Workshops (IPDPSW)**, pp. 1208-1215, Orlando, FL, May 29, 2017.

35. M. J. Lewis, G. K, Thiruvathukal, V. Vishwanath, M. E. Papka, and A. Johnson, *A Distributed Graph Approach for Pre-processing Linked RDF Data Using Supercomputers*, **International Workshop on Semantic Big Data 2017 (SBD 2017)**, Article No. 6, Chicago, IL, May 19, 2017.

36. S. Liu, E-S. Jung, R. Kettimuthu, X-H. Sun, M. E. Papka, *Towards Optimizing Large-Scale Data Transfers with End-To-End Integrity Verification*, **2016 IEEE International Conference on Big Data (Big Data)**, pp. 3002-3007, Washington, D.C., December 5-8, 2016.

37. S. Read, M. E. Papka, *Improving Models of Document Cycling: Accounting for the Less Visible Writing Activities of an Annual Reporting Process at a Supercomputing Facility*, **2016 IEEE International Professional Communication Conference (IPCC)**, pp. 1-10, November 14, 2016. [2016 James M. Lufkin Award for Best IPCC Paper]

38. D. Zawislak, B. Toonen, W. Allcock, S. Rizzi, J. Insley, B. Vishwanath, M. E. Papka, *Early Investigations into Using a Remote RAM Pool wth the vl3 Visualization Framework*, **Proceedings of the 2nd Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization**, pp. 23-28, November 13, 2016.

39. P. Malakar, V. Vishwanath, C. Knight, T. Munson, M. E. Papka, *Optimal Execution of Co-analysis for Large-scale Molecular Dynamics Simulations*, **Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis**, Article No. 60, Salt Lake City, UT, November 13-18, 2016.

40. S. Wallace, X. Yang, V. Vishwanath, W. E. Allcock, S. Coghlan, M. E. Papka, Z. Lan, *A Data Driven Scheduling Approach for Power Management on HPC Systems*, **Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis**, Article No. 56, Salt Lake City, UT, November 13-18, 2016.

41. T. Marrinan, A. Nishimoto, J. A. Insley, S. Rizzi, A. Johnson, M. E. Papka, *Interactive Multi-Modal Display Spaces for Visual Analysis*, **Proceedings of the 2016 ACM on Interactive Surfaces and Spaces**, pp. 421-426, Niagara Falls, Canada, November 6, 2016.

42. P. Beckman, R. Sankaran, C. Catlett, N. Ferrier, R. Jacob, M. E. Papka, *Waggle: An Open Sensor Platform for Edge Computing*, **IEEE 2016 SENSORS**, pp. 1-3, doi:10.1109/ICSENS.2016.7808975, Orlando, FL, October 30–November 2, 2016.

43. M. Shih, S. Rizzi, J. Insley, T. Uram, V. Vishwanath, M. Hereld, M. E. Papka, K. L. Ma, *Parallel Distributed, GPU-Accelerated, Advanced Lighting Calculations For Large-Scale Volume Visualization*, **2016 IEEE 6th Annual Symposium on Large Data Analysis and Visualization (LDAV)**, pp. 47-55, October 2016. [Honorable Mention, Best Paper]

44. S. Rizzi, M. Hereld, J. Insley, P. Malakar, M. E. Papka, T. Uram, V. Vishwanath, *Coupling LAMMPS and the vl3 Framework for Co-Visualization of Atomistic Simulations*, **2016 IEEE International Parallel and Distributed Processing Symposium (IPDPS) Workshop on High Performance Data Analysis and Visualization (HPDAV) 2016**, pp. 1038-1042, Chicago, IL, May 23, 2016.

45. S. I. Tissa, V. Vishwanath, J. Winans, R. Kettimuthu, M. E. Papka, *Improving Parallel File Transfers*, **Greater Chicago Area Systems Research Workshop (GCASR)**, Chicago, IL, April 2016. [Poster]

46. T. Marrinan, M. E. Papka, *Future Outlooks for Enabling Interactive Supercomputing Frameworks*, **Greater Chicago Area Systems Research Workshop (GCASR)**, Chicago, IL, April 2016. [Poster]

47. H. Bui, P. Malakar, V. Vishwanath, T. S. Munson, E-S. Jung, M. E. Papka, J. Leigh, *Improving Communication Throughput by Multipath Load Balancing on Blue Gene/Q*, **2015 IEEE 22nd International Conference on High Performance Computing (HiPC)**, Bengaluru, India, pp. 115-124 December 2015.

48. P. Malakar, V. Vishwanath, T. Munson, C. Knight, M. Hereld, S. Leyffer, M. E. Papka, *Optimal Scheduling of In-Situ Analysis for Large-Scale Scientific Simulations*, **SC'15 Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis**, Article No. 52, Austin, TX, November 15-20, 2015.

49. J. T. Childers, T. D. Uram, T. J. LeCompte, M. E. Papka, D. P. Benjamin, *Simulation of LHC Events on a Millions Threads*, **21st International Conference on Computing in High Energy and Nuclear Physics (CHEP)**, 664(9), Okinawa, Japan, April 13-17, 2015.

50. I. Wald, A. Knoll, G. P. Johnson, W. Usher, V. Pascucci, M. E. Papka, *CPU Ray Tracing Large Particle Data with Balanced P-k-d Trees*, **Proceedings of IEEE 2015 Visualization Conference** Chicago, IL, October 25-30, 2015.

51. K. Reda, A. Gonzalez, J. Leigh, M. E. Papka, *Tell Me What Do You See: Detecting Perceptually-Separated Visual Patterns via Clustering of Image-Space Features in Visualizations*, **Proceedings of IEEE 2015 Visualization Conference**, Chicago, IL, October 25-30, 2015. [Poster]

52. A. Young, M. E. Papka, *Visualization of Job Execution Data at Long Timescales*, **Proceedings of IEEE 2015 Visualization Conference**, Chicago, IL, October 25-30, 2015. [Poster]

53. J. Jiang, M. Hereld, J. Insley, M. E. Papka, S. Rizzi, T. Uram, V. Vishwanath, *Streaming Ultra High Resolution Images to Large Tiled Display at Nearly Interactive Frame Rates with vl3*, **Proceedings of IEEE 2015 Visualization Conference**, Chicago, IL, October 25-30, 2015. [Poster, Best Poster Award]

54. S. Rizzi, M. Hereld, J. Insley, M. E. Papka, T. Uram, V. Vishwanath, *Large-Scale Co-Visualization for LAMMPS using vl3*, **Proceedings of IEEE 2015 Visualization Conference**, Chicago, IL, October 25-30, 2015. [Poster]

55. S. Rizzi, M. Hereld, J. A. Insley, M. E. Papka, T. Uram, V. Vishwanath, *Large-Scale Parallel Visualization of Particle-Based Simulations using Point Sprites and Level-of-Detail*, **Proceedings of the Eurographics Symposium on Parallel Graphics and Visualization (EGPGV15)**, C. Dachsbacher and P. Navratil, Eds., The Eurographics Association, Cagliari, Sardinia, Italy, May 25-26, 2015.

56. S. Wallace, V. Vishwanath, S. Coghlan, Z. Lan, M. E. Papka, *Comparison of Vendor Supplied Environmental Data Collection Mechanisms*, **2015 IEEE International Conference on Cluster Computing (Cluster 2015)**, pp. 690-697, Chicago, IL, September 8-11, 2015.

57. K. Reda, A. E. Johnson, M. E. Papka, J. Leigh, *Effects of Display Size and Resolution on User Behavior and Insight Acquisition in Visual Exploration*, **Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI '15)**, pp. 2759-2768, Seoul, Republic of Korea, April 18-23, 2015.

58. S. Rizzi, M. Hereld, J. A. Insley, M. E. Papka, T. Uram, V. Vishwanath, *Large-Scale Parallel Visualization of Particle Datasets Using Point Sprites*, **SC'14 Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis**, New Orleans, LA, November 16-21, 2014. [Poster]

59. P. Lindner, A. Rodriguez, T. Uram, M. E. Papka, *Augmenting Views on Large Format Displays with Tablets*, **Proceedings of the 2nd ACM Symposium on Spatial User Interaction (SUI 2014)**, Honolulu, HI, October 4-5, 2014. [Poster]

60. S. Read and M. E. Papka, *Genre Cycling: The Infrastructural Function of an Operational Assessment Review and Reporting Process at a Federal Scientific Supercomputing User Facility*, **Proceedings of the 32nd ACM International Conference on Design of Communication**, Article No. 10, Colorado Springs, CO, September 27-28, 2014.

61. E. Berrocal, L. Yu, S. Wallace, M. E. Papka, Z. Lan, *Exploring Void Search for Fault Detection on Extreme Scale Systems*, **Proceedings of IEEE Cluster 2014**, Madrid, Spain, September 22-26, 2014. [Best Paper Award]

62. H. Bui, V. Vishwanath, H. Finkel, K. Harms, J. Leigh, S. Habib, K. Heitmann, M. E. Papka, *Scalable Parallel I/O on Blue Gene/Q Supercomputer Using Compression, Topology-Aware Data Aggregation, and Subfiling*, **Proceedings of the 22nd Euromicro International Conference on Parallel, Distributed, and network-based Processing (PDP 2014)**, Turin, Italy, February 12-14, 2014.

63. A. Knoll, I. Wald, P. A. Navratil, M. E. Papka, K. P. Gaither, *Ray Tracing and Volume Rendering Large Molecule Data on Multi-Core and Many-Core Architectures*, **Proceedings of the 8th International Workshop on Ultrascale Visualization (UltraVis '13)**, Article No. 5, Denver, CO, November 17, 2013.

64. X. Yang, Z. Zhou, S. Wallace, Z. Lan, W. Tang, S. Coghlan, M. E. Papka *Integrating Dynamic Pricing of Electricity into Energy Aware Scheduling for HPC Systems*, **SC'13 Proceedings of 2013 International Conference for High Performance Computing, Networking, Storage and Analysis**, Article No. 60, Denver, CO, November 17-22, 2013.

65. S. Kumar, A. Saha, V. Vishwanath, P. Carns, J. A. Schmidt, G. Scorzelli, H. Kolla, R. Grout, R. Latham, R. Ross, M. E. Papka, J. Chen, V. Pascucci *Characterization and Modeling of PIDX Parallel I/O for Performance Optimization*, **SC'13 Proceedings of 2013 International Conference for High Performance Computing, Networking, Storage and Analysis**, Article No. 67, Denver, CO, November 2013.

66. N. Leaf, V. Vishwanath, J. A. Insley, M. Hereld, M. E. Papka, K.-L. Ma, *Efficient Parallel Volume Rendering of Large-Scale Adaptive Mesh Refinement Data*, **2013 IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV)**, pp. 35-42, October 2013.

67. K. Reda, A. Knoll, K. Nomura, M. E. Papka, A. E. Johnson, J. Leigh, *Visualizing Large-Scale Atomistic Simulations in Ultra-resolution Immersive Environments*, **Proceedings of the 2013 IEEE Symposium on Large Data Analysis and Visualization (LDAV 2013)**, pp. 59-66, Atlanta, GA, October 13-14, 2013.

68. S. Lakshminarasimhan, D. A. Boyuka, S. V. Pendse, X. Zou, J. Jenkins, V. Vishwanath, M. E. Papka, N. F. Samatova, *Scalable in Situ Scientific Data Encoding for Analytical Query Processing*, **Proceedings of the 22nd International Symposium on High-Performance Parallel and Distributed Computing (HPDC'13)**, pp. 1-12, New York, NY, June 17-21, 2013.

69. V. Morozov, K. Kumaran, V. Vishwanath, J. Meng, M. E. Papka, *Early Experience on the Blue Gene/Q Supercomputing System*, **27th IEEE International Symposium on Parallel and Distributed Processing (IPDPS 2013)**, pp. 1229-40, Boston, MA, May 20-24, 2013.

70. S. Wallace, V. Vishwanath, S. Coghlan, Z. Lan, M. E. Papka, *Measuring Power Consumption on IBM Blue Gene/Q*, **2013 Power-Aware Computing (HPPAC) Workshop** (in conjunction with the IEEE 27th International Symposium on Parallel and Distributed Processing Symposium), pp. 853-59, Cambridge, MA, May 2013.

71. V. Morozov, J. Meng, V. Vishwanath, K. Kumaran, M. E. Papka, *Characterization and Understanding Machine-Specific Interconnects*, **Proceedings of the 12th International Conference on Parallel Computing Technologies (PaCT 2013)**, pp. 90-104, St. Petersburg, Russia, September 30-October 4, 2013.

72. E. R. Schendel, S. Harenberg, H. Tang, V. Vishwanath, M. E. Papka, N. F. Samatova, *A Generic High-Performance Method for Deinterleaving Scientific Data*, **Proceedings of the 19th International Conference on Parallel and Distributed Computing (Euro-Par 2013)**, 8097 (2013) pp. 571-582, Aachen, Germany, August 2013.

73. A. Knoll, J. Insley, M. E. Papka, K.-I. Nomura, R. K. Kalia, A. Nakano, P. Vashishta, *Molecular Dynamics Simulation of Amorphous SiO2 Fracture*, **2012 SC Companion: High Performance Computing, Storage and Analysis (SCC)**, pp. 1569-71, Salt Lake City, UT, November 2012.

74. H. Bui, V. Vishwanath, J. Leigh, M. E. Papka, *Evaluating Communication Performance in BlueGene/Q and Cray XE6 Supercomputers*, **2012 SC Companion: High Performance Computing, Storage and Analysis (SCC)**, pp. 1514-14, Salt Lake City, UT, November 2012.

75. J. A. Insley, M. Hereld, M. E. Papka, R. Wagner, R. Harkness, M. L. Norman, D. R. Reynolds, *Direct Numerical Simulations of Cosmological Reionization: Field Comparison: Density*, **2012 SC Companion: High Performance Computing, Storage and Analysis (SCC)**, pp. 1572-73, Salt Lake City, UT, November 2012.

76. H. Bui, V. Vishwanath, J. Leigh, M. E. Papka, *Evaluating Communication Performance in BlueGene/Q and Cray XE6 Supercomputers*, **2012 SC Companion: High Performance Computing, Storage and Analysis (SCC)**, pp. 1515-15, Salt Lake City, UT, November 2012. [Poster]

77. K. L. Duffin, N. T. Karonis, C. E. Ordonez, M. E. Papka, G. Coutrakon, B. Erdelyi, E. C. Olson, T. D. Uram, *An Analysis of a Distributed GPU Implementation of Proton Computed Tomographic (pCT) Reconstruction*, **2012 SC Companion: High Performance Computing, Storage and Analysis (SCC)**, pp. 166-75, Salt Lake City, UT, November 2012.

78. J. A. Insley, M. Hereld, M. E. Papka, R. Wagner, R. Harkness, M. L. Norman, D. R. Reynolds, *Direct Numerical Simulations of Cosmological Reionization: Field Comparison: Ionization Fraction*, **2012 SC Companion: High Performance Computing, Storage and Analysis (SCC)**, pp. 1574-75, Salt Lake City, UT, November 2012.

79. S. Kumar, V. Vishwanath, P. Carns, J. A. Levine, R. Latham, G. Scorzelli, H. Kolla, R. Grout, R. Ross, M. E. Papka, J. Chen, V. Pascucci, *Efficient Data Restructuring and Aggregation for I/O Acceleration in PIDX*, **SC'12 Proceedings of 2012 International Conference for High Performance Computing, Networking, Storage and Analysis**, Article No. 50, Salt Lake City, UT, November 2012.

80. S. Liu, V. Vishwanath, J. Insley, M. Hereld, M. E. Papka, V. Pascucci, *A Static Load Balancing Scheme for Parallel Volume Rendering on Multi-GPU Clusters*, **Proceedings of the 2012 IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV)**, Seattle, WA, October 14-15, 2012. [Poster]

81. V. Morozov, J. Meng, V. Vishwanath, J. R. Hammond, K. Kumaran, M. E. Papka, *ALCF MPI Benchmarks: Understanding Machine-Specific Communication Behavior*, **Proceedings of the 41st International Conference on Parallel Processing Workshops (ICPPW)**, pages 19-28, Pittsburgh, PA, September 2012.

82. N. Kotava, A. Knoll, M. Schott, C. Garth, X. Tricoche, C. Kessler, E. Cohen, *Volume rendering with Multidimensional Peak Finding*, **Proceedings of the 5th IEEE Pacific Visualization Symposium (PacificVis)**, pages 161-68, Songdo, Korea, February 28-March 2, 2012.

83. D. Chau, B. McGinnis, J. Talandis, J. Leigh, T. Peterka, A. Knoll, A. Sumer, M. E. Papka, and J. Jellinek, *A Simultaneous 2D/3D Autostereo Workstation*, **Proceedings of SPIE 2012**, Stereoscopic Displays and Applications XXIII, 8288, San Jose, CA, February 2012.

84. G. Coutrakon, K. Duffin, B. Erdelyi, N. Karonis, E. Olson, C. Ordonez, M. E. Papka, T. Uram, *High-Performance Multiple-CPU/GPU Proton Computed Tomography*, **Transactions of the American Nuclear Society**, 106 (2012), pp. 70-72.

85. K. Moreland, R. Oldfield, P. Marion, S. Jourdain, N. Podhorszki, V. Vishwanath, N. Fabian, C. Docan, M. Parashar, M. Hereld, M. E. Papka, and S. Klasky, *Examples of In Transit Visualization*, **Second Annual International Workshop on Petascale Data Analytics: Challenges and Opportunities**, pp. 1-6, 2011.

86. J. A. Insley, R. Wagner, R. Harkness, D. R. Reynolds, M. L. Norman, M. Hereld, E. C. Olson, M. E. Papka, V. Vishwanath, *Modeling Early Galaxies Using Radiation Hydrodynamics*, **Proceedings of the 2011 companion on High Performance Computing Networking, Storage and Analysis Companion**, pp. 141-42, Seattle, WA, November 2011.

87. J. A. Insley, L. Grinberg, D.A. Fedosov, V. Morozov, B. Caswell, M. E. Papka, G. E. Karniadakis, *Blood Flow: Multi-Scale Modeling and Visualization*, **Proceedings of the 2011 companion on High Performance Computing Networking, Storage and Analysis Companion**, pp. 139-40, Seattle, WA, November 2011.

88. J. A. Insley, L. Grinberg, M. E. Papka, G. E. Karniadakis, *Visualizing Multiscale Simulation Data*, **Proceedings of the 2011 companion on High Performance Computing Networking, Storage and Analysis Companion**, pp. 101-2, Seattle, WA, November 2011. [Poster]

89. M. Rasquin, P. Marion, V. Vishwanath, B. Matthews, M. Hereld, K. Jansen, R. Loy, A. Bauer, M. Zhou, O. Sahni, J. Fu, N. Liu, C. Carothers, M. Shephard, M. E. Papka, K. Kumaran, B. Geveci, *Co-Visualization of Full Data and In Situ Data Extracts from Unstructured Grid CFD at 160K Cores*, **Proceedings of the 2011 companion on High Performance Computing Networking, Storage and Analysis Companion**, pp. 103-4, Seattle, WA, November 2011. [Poster]

90. V. Vishwanath, M. Hereld, V. Morozov, M. E. Papka, *Topology-Aware Data Movement and Staging for I/O Acceleration on Blue Gene/P Supercomputing Systems*, **SC'11 Proceedings of 2011 International Conference for High Performance Computing, Networking, Storage and Analysis**, Article No. 19, Seattle, WA, November 2011.

91. L. Grinberg, J. A. Insley, V. Morozov, M. E. Papka, G. E. Karniadakis, D. Fedosov, K. Kumaran, *A New Computational Paradigm in Multiscale Simulations: Application to Brain Blood Flow*, **SC'11 Proceedings of 2011 International Conference for High Performance Computing, Networking, Storage and Analysis**, pp. 1-12, Seattle, WA, November 2011.

92. M. Hereld, J. A. Insley, E.C. Olson, M. E. Papka, V. Vishwanath, M. L. Norman, and R. Wagner, *Exploring Large Data over Wide Area Networks*, **2011 IEEE Symposium on Large Data Analysis and Visualization (LDAV)**, pp. 133-34, 2011.

93. J. A. Insley, L. Grinberg, M. E. Papka, *Visualizing Multiscale, Multiphysics Simulation Data: Brain Blood Flow*, **2011 IEEE Symposium on Large Data Analysis and Visualization (LDAV)**, pp. 3-7, Providence, RI, October 2011.

94. V. Vishwanath, M. Hereld, M. E. Papka, *Toward Simulation-Time Data Analysis and I/O Acceleration on Leadership-Class Systems*, **2011 IEEE Symposium on Large Data Analysis and Visualization (LDAV)**, pp. 9-14, Providence, RI, October 2011.

95. M. Hereld, M. E. Papka, J. A. Insley, M. L. Norman, E. C. Olson, and R. Wagner, *Interactive Large Data Exploration over the Wide Area*, **TG'11 Proceedings of the 2011 TeraGrid Conference: Extreme Digital Discovery**, Article No. 19, July 2011.

96. J. A. Insley, L. Grinberg, M. E. Papka, *Visualization of Multiscale Simulation Data: Brain Blood Flow*, **TG'11 Proceedings of the 2011 TeraGrid Conference: Extreme Digital Discovery**, Article No. 18, July 2011.

97. T. D. Uram, M. E. Papka, M. Hereld, and M. Wilde, *A Solution Looking for Lots of Problems: Generic Portals for Science Infrastructure*, **TG'11 Proceedings of the 2011 TeraGrid Conference: Extreme Digital Discovery**, July 2011.

98. V. Vishwanath, M. Hereld, M. E. Papka, R. Hudson, G. C. Jordan IV, C. Daley, *In Situ Data Analysis and I/O Acceleration of FLASH Astrophysics Simulation on Leadership-Class System Using GLEAN*, **In SciDAC, Journal of Physics: Conference Series**, July 2011.

99. A. Knoll, T. Peterka, M. Hereld, M. E. Papka, B. Liu, M. Chan, J. Greeley, *Vis and Analysis for Computational Energy Materials Research*, **In SciDAC, Journal of Physics: Conference Series**, July 2011.

100. R. Hudson, J. Norris, L. B. Reid, K. Weide, G. C. Jordan, and M. E. Papka, *Experiences Using Smaash to Manage Data-Intensive Simulations*, **Proceedings of the 20th International Symposium on High-Performance Parallel and Distributed Computing**, pp. 205-15, San Jose, CA, June 2011.

101. A. Knoll, S. Thelen, I. Wald, C. D. Hansen, H. Hagen, and M. E. Papka, *Full-Resolution Interactive CPU Volume Rendering with Coherent BVH Traversal*, **Proceedings of IEEE Pacific Visualization 2011**, pp. 3-9, March 2011.

102. R. Hudson, J. Norris, L. B. Reid, G. C. Jordan, K. Weide, M. E. Papka, *Data-Intensive Management and Analysis for Scientific Simulations*, **Proceedings of the 9th Australasian Symposium on Parallel and Distributed Computing (AusPDC 2011)**, 118, pp. 13-14, Perth, Australia, January 17-20, 2011.

103. V. Vishwanath, M. Hereld, K. Iskra, V. Morozov, M. E. Papka, R. Ross, and K. Yoshii, *Accelerating I/O Forwarding in IBM Blue Gene/P Systems*, **IEEE/ACM International Conference for High Performance Computing, Networking, Storage, and Analysis**, pp. 1-10, November 2010.

104. S. Kumar, V. Pascucci, V. Vishwanath, P. Carns, M. Hereld, R. Latham, T. Peterka, M. E. Papka, and R. Ross, *Towards Parallel Access of Multi-Dimensional, Multi-Resolution Scientific Data*, **5th Petascale Data Storage Workshop (PDSW)**, pp. 1-5, November 2010.

105. W. Wu, T. D. Uram, M. Wilde, M. Hereld, and M. E. Papka, *Accelerating Science Gateway Development with Web 2.0 and Swift*, **Proceedings of the 2010 TeraGrid Conference**, 2010.

106. W. Wu, T. D. Uram, M. Wilde, M. Hereld, and M. E. Papka, *A Web 2.0-Based Scientific Application Framework*, **2010 IEEE 8th International Conference on Web Services**, pp. 642-43, 2010.

107. J. A. Insley, T. Leggett, M. E. Papka, *Using Dynamic Accounts to Enable Access to Advanced Resources Through Science Gateways*, **Proceedings of the 2009 ACM International Workshop on Grid Computing Environments (GCE '09)**, 14, Portland, OR, November 20, 2009.

108. W. Wu, T. Uram, M. E. Papka, *Web 2.0-Based Social Informatics Data Grid*, **Proceedings of the 2009 ACM International Workshop on Grid Computing Environments (GCE '09)**, 6, Portland, OR, November 20, 2009.

109. M. Hereld, J. A. Insley, E. C. Olson, M. E. Papka, T. D. Uram, V. Vishwanath, *Modeling Resource-Coupled Computations*, **Proceedings of the 2009 Workshop on Ultrascale Visualization**, pp. 27-33, Portland, OR, November 16, 2009.

110. M. Hereld, R. Hudson, J. Norris, M. E. Papka, and T. D. Uram, *Enabling Scientific Teamwork*, **Journal of Physics: Conference Series** 180 012085, SciDAC 2009, San Diego, CA, June 14-18, 2009.

111. W. Wu, M. E. Papka, R. Stevens, *Toward an OpenSocial Life Science Gateway*, **Proceedings of the 2008 Grid Computing Environments Workshop (GCE '08)**, pp. 1-6, Austin, TX, November 12, 2008.

112. M. Hereld, M. E. Papka, *The Data Analysis Computing Hierarchy*, **Proceedings of the 2008 Workshop on Ultrascale Visualization (UltraVis 2008)**, pp. 9-13, Austin, TX, November 16, 2008.

113. M. Hereld, E. Olson, M. E. Papka, and T. D. Uram, *Streaming Visualization for Collaborative Environments*, **Journal of Physics: Conference Series** 125 012097, SciDAC 2008, Washington, DC, July 13-17, 2008.

114. W. Wu, R. Edwards, I. R. Judson, M. Wilde, M. E. Papka, M. Thomas, R. Stevens, *TeraGrid Open Life Science Gateway*, **Proceedings of the 2008 TeraGrid Conference**, Las Vegas, NV, June 9-12, 2008.

115. M. Hereld, M. E. Papka, and T. D. Uram, *Collaboration as a Second Thought*, **Collaborative Technologies and Systems (CTS 2008)**, pp. 196-202, May 2008.

116. S. Adolphs, B. Bertenthal, S. Boker, R. Carter, C. Greenhalgh, M. Hereld, S. Kenny, G.-A. Levow, M. E. Papka, T. Pridmore, *Integrating Cyberinfrastructure into Existing e-Social Science Research*, **Proceedings of the 3rd International Conference on e-Social Science 2007 Conference**, Ann Arbor, MI, October 7-9, 2007.

117. B. Bertenthal, R. Grossman, D. Hanley, M. Hereld, S. Kenny, G.-A. Levow, M. E. Papka, S. Porges, K. Rajavenkateshwaran, R. Stevens, T. Uram, W. Wu, *Social Informatics Data Grid*, **Proceedings of the 3rd International Conference on e-Social Science 2007 Conference**, Ann Arbor, MI, October 7-9, 2007.

118. G. A. Levow, S. Waxmonsky, B. Bertenthal, D. McNeill, M. Hereld, S. Kenny, M. E. Papka, *SIDGrid: A Framework for Distributed, Integrated Multimodal Annotation, Archiving, and Analysis*, **Proceedings of the 7th SIGDial Workshop on Discourse and Dialogue**, pp. 231-34, Sydney, Australia, July 2006.

119. H. Gao, M. E. Papka, R. L. Stevens, *Extending Multicast Communications by Hybrid Overlay Network*, **Proceedings of the IEEE International Conference on Communications 2006 (ICC 2006)**, 2, pp. 820-88, Istanbul, Turkey, June 11-15, 2006.

120. M. Hereld, M. E. Papka, J. Binns, R. L. Stevens, *CupHolder: A Multi-Person Interactive High-Resolution Workstation*, **IEEE Virtual Reality Conference 2006**, pp. 323, Alexandria, VA, March 25-29, 2006.

121. H. Gao, M. E. Papka, R. L. Stevens, *Performance Metrics of IP Multicast Sessions*, **Proceedings of the 7th IEEE International Symposium on Multimedia**, December 12-14, 2005.

122. H. Gao, I. R. Judson, M. E. Papka, R. L. Stevens, *Middleware of Performance Analysis for Multimedia Grid*, **Proceedings of the 30th IEEE Conference on Local Computer Networks**, Sydney, Australia, November 15-17, 2005.

123. H. Gao, I. R. Judson, T. Uram, S. Lefvert, T. L. Disz, M. E. Papka, R. L. Stevens, *An Infrastructure of Network Services for Seamless Integration in Advanced Collaborative Computing Environments*, **Proceedings of the IEEE International Conference on Cluster Computing**, pp. 1-10, Burlington, MA, September 2005.

124. K. Keahey, M. E. Papka, Q. Peng, D. Schissel, G. Abla, T. Araki, J. Burruss, E. Feibush, P. Lane, S. Klasky, T. Leggett, D. McCune, L. Randerson, *Grids for Experimental Science: The Virtual Control Room*, **Proceedings of the 2nd International Workshop on Challenges of Large Applications in Distributed Environments (CLADE 2004)**, pp. 4-11, Honolulu, HI, June 7, 2004.

125. H. Gao, I. R. Judson, T. Uram, T. L. Disz, M. E. Papka, R. L. Stevens, *Capability Matching of Data Streams with Network Services*, **Proceedings of the 4th IEEE/ACM International Symposium on Cluster Computing and the Grid (CCGrid 2004)**, Chicago, IL, April 19-22, 2004.

126. D. P. Schissel, K. Keahey, T. Araki, J. R. Burruss, E. Feibush, S. M. Flanagan, I. Foster, T. W. Fredian, M. J. Greenwald, S. A. Klasky, T. Leggett, K. Li, D. C. McCune, P. Lane, M. E. Papka, Q. Peng, L. Randerson, A. Sanderson, J. Stillerman, M. R. Thompson, G. Wallace, *The National Fusion Collaboratory Project: Applying Grid Technology for Magnetic Fusion*, **Proceedings of the Workshop on Case Studies on Grid Applications at GGF10**, Berlin, Germany, March 13, 2004.

127. A. Majumder, D. Jones, M. McCrory, M. E. Papka, R. Stevens, *Using a Camera to Capture and Correct Spatial Photometric Variation in Multi-Projector Displays*, **Proceedings of the IEEE International Workshop on Projector-Camera Systems**, Nice, France, October 12, 2003.

128. W. van Drongelen, M. Hereld, H. C. Lee, M. E. Papka, and R. L. Stevens, *Simulation of Neocortical Epileptiform Activity Using Parallel Computing*, **Computational Neuroscience (CNS 2003)**, Allicante, Spain, July 5-9, 2003. [Poster]

129. H. Gao, R. Stevens, M. E. Papka, *The Design of Network Services for Advanced Collaborative Environments*, **Proceedings of the 3rd Workshop on Advanced Collaborative Environments (WACE)**, Seattle, WA, June 22-24, 2003.

130. J. A. Insley, M. E. Papka, *geeViz (Grid-Enabled Environment Visualization): Realtime Visualization of Distributed Systems*, **Proceedings of IEEE Visualization 2002 (VIS 2002)**, Boston, MA, October 27-November 1, 2002. [Poster]

131. J. Binns, G. Gill, M. Hereld, D. Jones, I. Judson, T. Leggett, A. Majumder, M. McCrory, M. E. Papka, R. Stevens, *Applying Geometry and Color Correction to Tiled Display Walls*, **Proceedings of IEEE Visualization 2002 (VIS 2002)**, Boston, MA, October 27-November 1, 2002. [Poster]

132. W. Allcock, J. Bester, J. Bresnahan, I. Foster, J. Gawor, J. A. Insley, J. M. Link, M. E. Papka, *GridMapper: A Tool for Visualizing the Behavior of Large-Scale Distributed Systems*, **Proceedings of the 11th IEEE International Symposium on High Performance Distributed Computing (HPDC-11)**, pp. 179-87, Edinburgh, Scotland, July 24-26, 2002.

133. W. Allcock, J. Bester, J. Bresnahan, I. Foster, J. Gawor, J. A. Insley, J. M. Link, M. E. Papka, *Real-time Performance Visualization of Distributed Systems*, **Proceedings of the 11th IEEE International Symposium on High Performance Distributed Computing (HPDC-11)**, Edinburgh, Scotland, July 24-26, 2002. [Poster]

134. L. Childers, T. Disz, R. Olson, M. E. Papka, R. Stevens, T. Udeshi, *Access Grid: Immersive Group-to-Group Collaborative Visualization*, **Proceedings of the 4th International Immersive Projection Technology Workshop**, Ames, IA, June 19-20, 2000.

135. L. Childers, T. Disz, M. Hereld, R. Hudson, R. Olson, I. Judson, M. E. Papka, J. Paris, R. Stevens, *ActiveSpaces on the Grid: The Construction of Advanced Visualization and Interaction Environments*, **Parallelldatorcentrum Seventh Annual Conference: Simulation and Visualization on the Grid**, 13 (1999), pp. 64-80, Stockholm, Sweden.

136. H. M. Tufo, P. F. Fischer, M. E. Papka, M. Syzmanski, *Hairpin Vortex Formation, A Case Study for Unsteady Visualization*, **Proceedings of the 41st CUG Conference**, Minneapolis, MN, May 24-28, 1999.

137. H. M. Tufo, P. F. Fischer, M. E. Papka, K. Blom, *Numerical Simulation and Immersive Visualization of Hairpin Vortices*, **Supercomputing '99: Proceedings of the 1999 ACM/IEEE Conference on Supercomputing**, Article 62, Portland, OR, October 1999.

138. T. Disz, M. E. Papka, R. Stevens *UbiWorld: An Environment Integrating Virtual Reality, Supercomputing, and Design*, **Proceedings of the 6th Heterogeneous Computing Workshop (HCW'97)**, pp. 46-57, Geneva, Switzerland, April 1, 1997.

139. I. Foster, M. E. Papka, R. Stevens, *Tools for Distributed Collaborative Environments: A Research Agenda*, **Proceedings of the 5th IEEE International Symposium on High Performance Distributed Computing**, pp. 23-8, Syracuse, NY, August 6-9, 1996.

140. M. E. Papka, R. Stevens *UbiWorld: An Environment Integrating Virtual Reality, Supercomputing, and Design*, **Proceedings of the 5th IEEE International Symposium on High Performance Distributed Computing**, pp. 306-7, Syracuse, NY, August 6-9, 1996.

141. T. Canfield, T. L. Disz, M. E. Papka, R. Stevens, M. Huang, V. Taylor, J. Chen, *Toward Real-Time Interactive Virtual Prototyping of Mechanical Systems: Experiences Coupling Virtual Reality with Finite Element Analysis*, **Proceedings of High Performance Computing '96**, New Orleans, LA, March 31-April 1, 1996.

142. T. L. Disz, M. E. Papka, M. Pellegrino, R. Stevens, *Sharing Visualization Experiences among Remote Virtual Environments*, **Proceedings of the International Workshop on High Performance Computing for Computer Graphics and Visualisation**, pp. 217-37, Swansea, Wales, July 3-4, 1995.

143. T. Disz, M. E. Papka, R. Stevens, M. Pellegrino, V. Taylor, *Virtual Reality Visualization of Parallel Molecular Dynamics Simulation*, **1995 Simulation Multiconference Symposium**, pp. 483-87, Phoenix, AZ, April 1995.

144. L. R. Turner, D. Levine, M. Huang, M. E. Papka, L. Kettunen, *Using the CAVE Virtual-Reality Environment as an Aid to 3-D Electromagnetic Field Computation*, **Proceedings of the Conference on the Computation of Electromagnetic Fields (COMPUMAG-Berlin)**, Berlin, Germany, July 10-13, 1995.

145. M. Huang, M. E. Papka, T. DeFanti, D. Levine, L. Turnery, L. Kettunen, *Virtual Reality Visualization of Accelerator Magnets*, **Proceedings of the SCS Simulation MultiConference: Simulation as a Critical Technology**, Phoenix, AZ, April 9-13, 1995.

146. S. Das, T. Franguiadakis, M. E. Papka, T. A. DeFanti, D. J. Sandin, *A Genetic Programming Application in Virtual Reality*, **Proceedings of the First IEEE Conference on Evolutionary Computation, IEEE World Congress on Computational Intelligence**, pp. 480-84, Orlando, FL, June 27-29, 1994.

147. C. Cruz-Neira, J. Leigh, M. E. Papka, C. Barnes, S. M. Cohen, S. Das, R. Engelmann, R. Hudson, T. Roy, L. Siegel, *Scientists in Wonderland: A Report on Visualization Applications in the CAVE Virtual Reality Environment*, **Proceedings of the IEEE 1993 Symposium on Research Frontiers in Virtual Reality**, pp. 59-66, San Jose, CA, October 25-26, 1993.

Technical Reports and Other Publications [Non-Peer Reviewed]

1. Y. Fan, P. Rich, W. Allcock, M. E. Papka, Z. Lan, *Hybrid Workload Scheduling on HPC Systems*, **arXiv:2109.05412**, 2021.

2. Z. Liu, R. Kettimuthu, M. E. Papka, I. Foster, *BFTrainer: Low-Cost Training of Neural Networks on Unfillable Supercomputer Nodes*, **arXiv:2106.12091**, 2021.

3. M. Salim, T. Uram, J. T. Childers, V. Vishwanath, M. E. Papka, *Toward Real-time Analysis of Experimental Science Workloads on Geographically Distributed Supercomputers*, **arXiv:2105.06571**, 2021.

4. Y. Fan, Z. Lan, J. T. Childers, P. Rich, W. Allcock, M. E. Papka, *Deep Reinforcement Agent for Scheduling in HPC*, **arXiv:2102.06243**, 2021.

5. M. Emani, V. Vishwanath, C. Adams, M. E. Papka, R. Stevens, L. Florescu, S. Jairath, W. Liu, T. Nama, A. Sujeeth, *Accelerating Scientific Applications with SambaNova Reconfigurable Dataflow Architecture*, **Computing in Science & Engineering**, 2021.

6. J. J. Hack and M. E. Papka *The US High-Performance Computing Consortium in the Fight Against COVID-19*, **IEEE Computing in Science and Engineering**, 22(6), pp. 75-80, October 2020.

7. S. Collis, P. Beckman, E. Kelly, C. Catlett, R. Sankaran, I. Altintas, J. Olds, N. Ferrier, S. Park, Y. Kim, M. E. Papka. *Introducing Sage: Cyberinfrastructure for Sensing at the Edge*, **EGU General Assembly Conference Abstracts**, May 2020.

8. M. A. Salim, T. D. Uram, J. T. Childers, P. Balaprakash, V. Vishwanath, M. E. Papka, *Balsam: Automated scheduling and execution of dynamic, data-intensive HPC workflows*, **arXiv:1909.08704**, 2019.

9. R. Gerber, J. Hack, K. Riley, K. Antypas, R. Coffey, E. Dart, T. Straatsma, J. Wells, D. Bard, S. Dosanjh, I. Monga, M. E. Papka, L. Rotman. *Exascale Requirements Reviews, March 9-10, 2017 – Tysons Corner, Virginia: Crosscut Report from an Office of Science review sponsored by: Advanced Scientific Computing Research, Basic Energy Sciences, Biological and Environmental Research, Fusion Energy Sciences, High Energy Physics, Nuclear Physics*, January 2018.

10. J. Vetter, A. Almgren, P. DeMar, K. Riley, K. Antypas, D. Bard, R. Coffey, E. Dart, S. Dosanjh, R. Gerber, J. Hack, I. Monga, M. E. Papka, L. Rotman, T. Straatsma, J. Wells, D. E. Bernholdt, W. Bethel, G. Bosilca, F. Cappello, T. Gamblin, S. Habib, J Hill, J. K. Hollingsworth, L. Curfman McInnes, K. Mohror, S. Moore, K. Moreland, R Roser, S. Shende, G. Shipman, S. Williams. *Advanced Scientific Computing Research Exascale Requirements Review, September 27-29, 2016 – Rockville, Maryland: Report from an Office of Science review sponsored by Advanced Scientific Computing Research*, 2017.

11. M. E. Papka, P. Messina, L. Wolf, B. Cerny, J. Collins. *Argonne Leadership Computing Facility 2016 Annual Report*. **Technical Report ANL-01/17**, Argonne National Laboratory, Argonne, Illinois.

12. T. D. Uram, M. E. Papka, *Expanding the Scope of High-Performance Computing Facilities*, **IEEE/AIP Computing in Science and Engineering**, May/June, 2016.

13. M. E. Papka, P. Messina, L. Wolf, B. Cerny, J. Collins. *Argonne Leadership Computing Facility 2015 Annual Report*. **Technical Report ANL-01/16**, Argonne National Laboratory, Argonne, Illinois.

14. J. J. Hack, M. E. Papka, *Big Data: Next-Generation Machines for Big Science*, **IEEE/AIP Computing in Science and Engineering**, 17(4), pp. 63-65, July-Aug. 2015.

15. M. E. Papka, P. Messina, L. Wolf, B. Cerny, J. Collins. *Argonne Leadership Computing Facility 2014 Annual Report*. **Technical Report ANL-01/15**, Argonne National Laboratory, Argonne, Illinois.

16. M. E. Papka, P. Messina, L. Wolf, B. Cerny, J. Collins. *Argonne Leadership Computing Facility 2013 Annual Report*. **Technical Report ANL-04/14**, Argonne National Laboratory, Argonne, Illinois.

17. M. E. Papka, P. Messina, L. Wolf, B. Cerny, J. Collins. *Argonne Leadership Computing Facility 2012 Annual Report*. **Technical Report ANL-06/13**, Argonne National Laboratory, Argonne, Illinois.

18. M. E. Papka, P. Messina, R. Coffey, C. Drugan. *Argonne Leadership Computing Facility 2011 Annual Report: Shaping Future Supercomputing*. **Technical Report ANL-12/22**, Argonne National Laboratory, Argonne, Illinois.

19. M. E. Papka, P. Messina, R. Coffey, C. Drugan. *Argonne Leadership Computing Facility 2010 Annual Report: Shaping Future Supercomputing*. **Technical Report ANL-11/5**, Argonne National Laboratory, Argonne, Illinois.

20. S. Ahern, A. Shoshani, K.-L. Ma, A. Choudhary, T. Critchlow, S. Klasky, V. Pascucci, J. Ahrens, W. Bethel, H. Childs, J. Huang, K. Joy, Q. Koziol, G. Lofstead, J. Meredith, K. Moreland, G. Ostrouchov, M. E. Papka, V. Vishwanath, M. Wolf, N. Wright, K. Wu. *Scientific Discovery at the Exascale: Report from the DOE/ASCR 2011 Workshop on Exascale Data Management, Analysis, and Visualization*, 2011.

21. C. Johnson, R. Ross, S. Ahern, J. Ahrens, W. Bethel, K-L. Ma, M. E. Papka, J. van Rosendale, H-W. Shen, J. Thomas, *Visualization and Knowledge Discovery: Report from DOE/ASCR Workshop on Visual Analysis and Data Exploration at Extreme Scale*, 2007.

22. D. Schissel, J. Burruss, A. Finkelstein, et al. *SciDAC Fusiongrid Project – A National Collaboratory to Advance the Science of High Temperature Plasma Physics for Magnetic Fusion*. **Technical Report DOE/ER25456**, The Trustees of Princeton University; Princeton Plasma Physics Laboratory; Massachusetts Institute of Technology; Lawrence Berkeley National Laboratory; Argonne National Laboratory; University of Utah, August 2006.

23. J. A. Insley and M. E. Papka, *Prototyping Simple Access to Visualization Resources*, **ClusterWorld**, June 2005.

24. N. Karonis, M. E. Papka, J. Binns, J. Bresnahan, and J. Link. *Effective Use of Dedicated Wide-Area Networks for High-Performance Distributed Computing*. **Technical Report ANL/MCS-P1151-0404**, Argonne National Laboratory, Argonne, Illinois, 2004.

25. T. Udeshi, R. Hudson, and M. E. Papka. *Seamless Multiresolution Isosurfaces Using Wavelets*. **Technical Report ANL/MCS-P801-0300**, Argonne National Laboratory, Argonne, Illinois, March 2000.

26. J. Ahrens, C. Law, W. Schroeder, K. Martin, and M. E. Papka. *A Parallel Approach for Efficiently Visualizing Extremely Large, Time-Varying Datasets*. **Technical Report LAUR-00-1620**, Los Alamos National Laboratory, Los Alamos, New Mexico, 2000.

27. J. Bresnahan, J. Insley, and M. E. Papka. *Interacting with Scientific Visualizations: User-Interface Tools within Spatially Immersive Displays*. **Technical Report ANL/MCS-P789-0100**, Argonne National Laboratory, Argonne, Illinois, 2000.

28. T. Disz, R. Olson, M. E. Papka, R. Stevens, M. Szymanski, and R. Firby. *Two Implementations of Shared Virtual Space Environments*. **Technical Report ANL/MCS-P652-0297**, Argonne National Laboratory, Argonne, Illinois, 1997.

29. T. Disz, M. E. Papka, M. Pellegrino, and R. Stevens. *CAVEcomm User Manual*. **Technical Memorandum ANL/MCS-TM-218**, Argonne National Laboratory, Argonne, IL, December 1996.

RESEARCH GRANTS and CONTRACTS

Leadership and engagement in more than $18M+ of DOD, DOE, NIH, NSF, and work for others funded research. Oversight and management of more than $1B+ in funding as director of the ALCF.

Current Grants

1. *Argonne Leadership Computing Facility (ALCF)*, <u>DOE</u> $42M (2010) $62M (2011-12) $61M (2013) $67M (2014) $80M (2015) $81M (2016) $80M (2017) $110M (2018) $140M (2019) $150M (2020) $150M (2021) $160M (2022) (PI, Argonne), Ongoing

2. *NSF Mid-Scale RI-1: SAGE: A Software-Defined Sensor Network*, <u>NSF</u> (OAC-1935984) $9,026,927 PI:Beckman@Northwestern (Subcontract to NIU $80K), 2019-2022

3. *Collaborative Research: PPoSS: Planning: A Heterogeneous HPC Environment for AI-Enabled Science*, <u>NSF</u> $40,000 (co-PI, NIU), 2021-2023

Past Grants

1. *Presidential Research, Scholarship, and Artistry Professor*, <u>Northern Illinois University</u> $20K (PI, NIU), 2020-2022

2. *COVID Research and Resources*, <u>DOE</u> $7,152,000 (PI, Argonne), 2020-2021

3. *MRI: Development of an Urban-Scale Instrument for Interdisciplinary Research*, <u>NSF</u> (OAC-1532133) $3,514,285 PI:Catlett@UChicago ($61,401 NIU portion) (Co-PI, NIU), 2015-2019

4. *CC*IIE Integration: Collaborative Research: EPSON: Embracing Parallel Networks and Storage for Predictable End-to-End Data Movement*, <u>NSF</u> (OAC-1440797) $279,928 (PI, NIU), 2014-2017

5. *pCT Imaging Using GPGPUs and Centralized Facilities*, <u>DOD</u> subcontract via Northern Illinois University, $1,041,697 (PI, Argonne) 2010-2013

6. *Collaborative Research: Scalable Multiscale Models for the Cerebrovasculature: Algorithms, Software and Petaflop Simulations*, <u>NSF</u> (OAC-0904190) $276,510 (PI, UChicago), 2009-2013

7. *MRI: Acquisition of PADS - A Petscale Active Data Store*, <u>NSF</u> (OAC-0821678) $1,102,135 (PI, UChicago), 2008-2012

8. *Collaborative Visualization and the Analysis Pipeline*, <u>DOE</u> $650,000 (PI, Argonne), 2007 - 2009

9. *Social Informatics Grid (SIDGrid)*, <u>NSF</u> (BCS-0537849) $2,029,933 (Senior Personnel, UChicago), 2005 - 2007

10. *SCI: TeraGrid Resource Partners*, <u>NSF</u> (OAC-0504086) $3,614,244 (Co-PI, UChicago), 2007-2011

11. *SCI: TeraGrid Early Operations*, <u>NSF</u> (OAC-0451491) $1,058,536 (Co-PI, UChicago), 2005-2007

12. *Middleware to Support Group to Group Collaboration* <u>DOE</u> $800,000 (Co-PI, Argonne), 2004-2006

13. *National Fusion Collaboratory*, <u>DOE</u> $440,000 (Senior Personnel, Argonne), 2004-2006

14. *Grid Visualization*, <u>DOE</u> subcontract from Kitware Inc. $70,000 (PI, Argonne), 2004-2006

15. *Advanced Biomedical Collaboration Testbed in Surgery, Anesthesia, and Emergency Medicine (ABC Testbed)*, <u>NIH</u> $3,487,139 (Senior Personnel, UChicago) 2003-2006

16. *A Data Intense Challenge: The Instrumented Oilfield of the Future*, <u>NSF</u> (CNS-0121523) $1,461,005 PI:Wheeler@UTexas ($384,000 UChicago portion) (Senior Personnel, UChicago), 2002-2005

17. *Extensible Network Services for the Access Grid*, <u>NSF</u> (OAC-0222509) $900,000 (Co-PI, UChicago), 2002-2005

18. *Scientific Workspaces of the Future*, <u>NSF</u> subcontract via University of Illinois, $800,000 (Co-PI, Argonne), 2002-2004

19. *Advanced Display Work*, <u>General Atomics Inc.</u> $90,000 (PI, Argonne), 2002-2003

20. *Advanced Visualization Technology Center*, <u>DOE</u> $1,750,000 (Co-PI, Argonne), 1999-2002

SYNERGISTIC ACTIVITIES – LAST 10 YEARS

- **Senior Member:** Association for Computing Machinery (ACM)

- **Senior Member:** Institute of Electrical and Electronics Engineers (IEEE)

- **Member:** American Association for the Advancement of Science (AAAS)

- **Member:** Computer Science Teachers Association (CSTA)

- **Reviewer:** International Symposium on Visual Computing, IEEE Visualization Conference, IEEE Information Visualization Conference, IEEE Visualization and Analysis Conference, National Science Foundation Major Research Instrumentation and Strategic Technologies for Cyberinfrastructure Programs, as well as numerous smaller workshops and conferences

- **Co-Chair Visualization Showcase:** Practice and Experience in Advanced Research Computing (2021) with Joseph Insley (ANL/NIU)

- **Program Committee:** Parallel AI and Systems for the Edge (2020 - 2021)

- **Steering Committee:** Symposium on Large Data Analysis and Visualization (2010 - 2019)

- **Program Committee:** The International Conference for High Performance Computing, Networking, Storage, and Analysis (SC18) - Technical Program [Data Analytics, Visualization & Storage] (2018)

- **General co-Chair:** IEEE Visualization 2015 (hosted in Chicago) with Maxine Brown (UIC)

- **Symposium co-Chair:** Symposium on Large Data Analysis and Visualization (2012) with Chris Johnson (Utah)

- **Advisory Board Member:**

  – Advisory Board for the NSF Funded Precipitating Change: Integrating Meteorology, Mathematics, and Computational Thinking (2016–2019)
  – Loyola University Chicago Computer Science Advisory Committee (2015–Present)
  – Harvard University Computational Science and Engineering Advisory Board (2012–Present)

- **Associate Editor:** Frontiers in High Performance Computing (*Architecture and Systems*) (2022)

- **Editorial Board Member:** IEEE Computing in Science and Engineering (CiSE) (*Department Editor for Leadership Computing*) (2015–2020)

- **Executive Sponsor:** Argonne African American Employee Resource Group (2019–Present)

Advisees Graduation Dates in []

- **Current Students:**

  – Greg Cross [Ph.D. Student] (UIC) [co-Advisor with Dan Schonfeld (UIC)]
  – Bharat Kale [M.S. 2018, Ph.D. Student] (NIU) [co-Advisor with Maoyuan Sun (NIU)]
  – Boyang Li [Ph.D. Student] (IIT) [co-Advisor with Zhiling Lan (IIT)]

- **Past Students:**

  – Yuping Fan [Ph.D. 2021] (IIT) [co-Advisor with Zhiling Lan]
  – Ryan Lewis [M.S. 2021] (NIU) [Advisor]

- – Priyanjani Chandra [M.S. 2020] (NIU) [co-Advisor with Pratool Bharti]
- – Mrinal Roy [M.S. 2019] (NIU) [Advisor]
- – Ankita Upadhyay [M.S. 2019] (NIU) [Advisor]
- – Sean Wallace [Ph.D. 2017] (IIT) [co-Advisor with Zhiling Lan]
- – Alessandro Febretti [Ph.D. 2017] (UIC) [Dissertation Committee]
- – Magda Baniukiewicz [M.S. 2017] (NIU) [Thesis Committee]
- – Joshua Boley [M.S. 2017] (NIU) [Thesis Committee]
- – Adam Young [M.S. 2015] (NIU) [Advisor]
- – Khairi Reda [Ph.D. 2014] (UIC) [Dissertation Committee]

- **Past Predocs and Postdocs:**

  - – Tommy Marrinan [Associate Professor, St. Thomas University]
  - – Khairi Reda [Associate Professor, Indiana University Indianapolis]
  - – Aaron Knoll [Principal Research Scientist, AMD]
  - – Venkatram Vishwanath [Scientist, Argonne National Laboratory]
  - – Eric Olson (Predoc) [Providence]
  - – Tushar Udeshi (Predoc) [Google, Inc.]
  - – Xinlian Liu [Associate Professor, Hood College]