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RESEARCH and PROFESSIONAL EXPERIENCE

Argonne National Laboratory (1992 – Present)

- **Founding co-Director**, *George Crabtree Institute for Discovery and Sustainability* (2024 – Present), *a joint institute of the University of Illinois Chicago and Argonne National Laboratory*, In collaboration with fellow co-director, responsible for the overall direction of the institute, including setting focus and developing joint efforts between Argonne National Laboratory and the University of Illinois Chicago.
- **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: *Polaris*; an HPE Apollo 6500 Gen10+ supercomputer, and *Aurora*; an Intel CPU/GPU supercomputer currently ranked the fastest AI (HPL MxP) system in the world that supports scientific and engineering open science research.
- **Deputy Associate Laboratory Director**, *Computing, Environment and Life Sciences 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. Executes a research program that couples computing-related activities with various science domains whose future depends on progress in computing.
- **Senior 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)
    - Assistant Scientist - RD3 (2000 – 2001)
    - Scientist - RD2 (1996 – 2000)
    - Scientist Associate - RD1 (1992 – 1996)

University of Illinois Chicago (2022 – Present)

- **Warren McCulloch Professor**, *Department of Computer Science* (2024 – Present), Tenured faculty member engaged in research and instruction. Member of the SPEAR Laboratory and Honors College. Active research includes scientific visualization, large-scale data analysis, and building research infrastructure supporting science. Current efforts focused on analyzing the data output of traditional supercomputers, large-scale scientific instruments, and sensor networks to integrate edge and high-performance computing across the computing continuum.
    - Professor (2022 – 2024)

- **Interim Director**, *Electronic Visualization Laboratory* (2024 - Present), Leads an interdisciplinary laboratory that performs research in the areas of high-performance visualization, virtual reality, and networked collaboration. EVL is home to pioneering technologies such as CAVE™, SAGE™, and CAVE2™. Facilitates global collaborations and advances in visual data science, pushing the boundaries of big data challenges and high-resolution visualization.

University of Chicago (1999 – Present)

- **Senior Scientist**, *The University of Chicago Consortium for Advanced Science and Engineering* (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 – 2023)

- **Research Professor**, Department of Computer Science (2021 – 2023), *Co-supervisor of graduate students in the area of high performance computing.*

Northern Illinois University (2012 – 2023)

- **Presidential Research, Scholarship and Artistry Professor**, *Department of Computer Science*, A tenured faculty member engaged in research and instruction. In 2012, founded the *Data, Devices, and Interaction Laboratory* (ddiLab) as a new university resource to support various computer science research projects. The lab helped students investigate how computing can support and enhance knowledge and discovery.
  - Visiting Distinguished Professor (2022 – 2023)
  - PRSA Professor (2020 – 2022)
  - Professor (2017 – 2020)
  - Associate Professor (2012 – 2017)

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 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

- University of Illinois Chicago
  - Introduction to High Performance Computing (CS 494) (Sp2023, Sp2024)
  - Undergraduate Mentoring - (2022 – Present) [Early Research Scholars Team (2023-24)]
  - Honors College Mentoring - (2023 – Present) [2 honors students]
- Northern Illinois University
  - Big Ideas Lecture (CSCI 600) (Fa2018, Fa2019, Sp2020, Fa2020, Sp2021, Fa2021, Sp2022)
  - Data Structures and Algorithms (CSCI 340) (Sp2014, Sp2017, Sp2020, Fa2020, Sp2021, Fa2021)
  - Data Visualization (CSCI 490, 627) (Fa2012, Fa2013, Sp2015, Sp2016, Sp2019, Sp2022)
  - Information Visualization (CSCI 628) (Sp2020)
  - Introduction to Virtual Reality (CSCI 490, 680) (Sp2018)
  - 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 - (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

- Best Paper – *Scaling Computational Fluid Dynamics: In Situ Visualization of NekRS using SENSEI*, 2023 IEEE/ACM International Workshop on In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV)

- 2023 IEEE SciVis Contest Winner – Winner of best overall and best workflow of the *2023 IEEE SciVis Contest* Neuronal Network Simulations of the Human Brain
- 2023 Argonne National Laboratory Commercialization Excellence Award for Delivering Impact
- 2023 Argonne Board of Governors' Distinguished Performance Award
- Honorable Mention, Best Paper – *ChemoGraph: Interactive Visual Exploration of the Chemical Space*, EuroVis'23
- ACM Gordon Bell Special Prize for HPC-Based COVID-19 Research – *GenSLMs: Genome-scale Language Models Reveal SARS-CoV-2 Evolutionary Dynamics*, Supercomputing 2022
- 2022 Argonne Board of Governors' Pinnacle of Education Award
- 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 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]

52. A. E. Johnson, L. Renambot, G. E. Marai, D. Tsoupikova, M. E. Papka, L. Long, D. Plepys, J. Talandis, M. D. Brown, J. Leigh, D. J. Sandin, and T. A. DeFanti, *Electronic Visualization Laboratory's 50th Anniversary Retrospective: Look to the Future, Build on the Past*, **PRESENCE: Virtual and Augmented Reality**, 2024. doi.org/10.1162/pres_a_00421

51. M. Zvyagin, A. Brace, K. Hippe, Y. Deng, B. Zhang, C. Orozco Bohorquez, A. Clyde, B. Kale, D. Perez-Rivera, H. Ma, C. M. Mann, M. Irvin, D. G. Ozgulbas, N. Vassilieva, J. G. Pauloski, L. Ward, V. Hayot-Sasson, M. Emani, S. Foreman, Z. Xie, D. Lin and M. Shukla and Weili Nie and J. Romero, C. Dallago, A. Vahdat, C. Xiao, T. Gibbs, I. Foster, J. J. Davis, M. E. Papka, T. Brettin, R. Stevens, A. Anandkumar, V. Vishwanath, A. Ramanathan, *GenSLMs: Genome-scale Language Models Reveal SARS-CoV-2 Evolutionary Dynamics*, **The International Journal of High Performance Computing Applications**, 37(6), pp. 683 – 705, 2023, doi.org/10.1177/10943420231201154. [***ACM Gordon Bell Prize***]

50. 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.

49. 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, doi.org/10.1109/TPDS.2022.3205325.

48. 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.org/10.1109/MCSE.2021.3139405.

47. 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]

46. 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.

45. 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.

44. 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.

43. 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.

42. 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.

41. 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, doi:10.1080/-15361055.2017.1390388.

40. 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.

39. 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.

38. 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.

37. 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.

36. 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.

35. 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.

34. 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.

33. 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**, 2015, doi.org/10.1109/TCC.2015.2457423.

32. 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, doi.org/10.1016/j.jpdc.2015.06.006.

31. 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.

30. 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.

29. 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.

28. 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.

27. 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.

26. 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.

25. 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.

24. 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.

23. 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.

22. 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.

21. 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.

20. 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.

19. 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.

18. 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.

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5. 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.

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3. 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.

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1. 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 $26M+ of DOD, DOE, NIH, NSF, and work for others funded research. Oversight and management of more than $1.6B+ in funding as director (PI) of the ALCF.

Current Grants

6. *Argonne Leadership Computing Facility (ALCF)*, DOE $42M (2010) $62M (2011) $62M (2012) $61M (2013) $67M (2014) $80M (2015) $81M (2016) $80M (2017) $110M (2018) $140M (2019) $150M (2020) $150M (2021) $160M (2022) $175M (2023) $219M (2024) (PI, Argonne), Ongoing
5. *NSF Mid-Scale RI-1: SAGE: A Software-Defined Sensor Network*, NSF (OAC-1935984) $9,026,927 PI:Beckman@Northwestern (Subcontract to UIC $54K), 2023
4. *CyberTraining: Implementation: Medium: FOUNT: Scaffolded, Hands-On Learning for a Data-Centric Future*, NSF, (OAC-2230080) $204,815, (co-PI, NIU) 2022 - 2025
3. *A National-Scale Testbed Supporting Artificial Intelligence Research Spanning the Computing Continuum*, NSF, (OAC-2331263) $120,000 (UIC portion of $3,200,000), (co-PI, UIC) 2023 - 2026
2. *Research Infrastructure: MRI: Track 2 Acquisition of Data Observation and Computation Collaboratory (DOCC)*, NSF, (CNS-2320261) $1,548,545, (co-PI, UIC) 2023 - 2026
1. *Chicagoland Computational Traineeship in High Energy Particle Physics*, DOE, (CNS-2320261) $650,000 (UIC CS portion of $2,600,000), (co-PI, UIC) 2022 - 2027

Past Grants

22. *NSF Mid-Scale RI-1: SAGE: A Software-Defined Sensor Network*, NSF (OAC-1935984) $9,026,927 PI:Beckman@Northwestern (Subcontract to NIU $80K), 2019-2022
21. *Collaborative Research: PPoSS: Planning: A Heterogeneous HPC Environment for AI-Enabled Science*, NSF $40,000 (co-PI, NIU), 2021-2022
20. *Presidential Research, Scholarship, and Artistry Professor*, Northern Illinois University $20K (PI, NIU), 2020-2022
19. *COVID Research and Resources*, DOE $7,152,000 (PI, Argonne), 2020-2021
18. *MRI: Development of an Urban-Scale Instrument for Interdisciplinary Research*, NSF (OAC-1532133) $3,514,285 PI:Catlett@UChicago ($61,401 NIU portion) (Co-PI, NIU), 2015-2019
17. *CC*IIE Integration: Collaborative Research: EPSON: Embracing Parallel Networks and Storage for Predictable End-to-End Data Movement*, NSF (OAC-1440797) $279,928 (PI, NIU), 2014-2017
16. *pCT Imaging Using GPGPUs and Centralized Facilities*, DOD subcontract via Northern Illinois University, $1,041,697 (PI, Argonne) 2010-2013
15. *Collaborative Research: Scalable Multiscale Models for the Cerebrovasculature: Algorithms, Software and Petaflop Simulations*, NSF (OAC-0904190) $276,510 (PI, UChicago), 2009-2013
14. *MRI: Acquisition of PADS - A Petscale Active Data Store*, NSF (OAC-0821678) $1,102,135 (PI, UChicago), 2008-2012
13. *Collaborative Visualization and the Analysis Pipeline*, DOE $650,000 (PI, Argonne), 2007 - 2009
12. *Social Informatics Grid (SIDGrid)*, NSF (BCS-0537849) $2,029,933 (Senior Personnel, UChicago), 2005 - 2007

11. *SCI: TeraGrid Resource Partners*, NSF (OAC-0504086) $3,614,244 (Co-PI, UChicago), 2007-2011
10. *SCI: TeraGrid Early Operations*, NSF (OAC-0451491) $1,058,536 (Co-PI, UChicago), 2005-2007
9. *Middleware to Support Group to Group Collaboration* DOE $800,000 (Co-PI, Argonne), 2004-2006
8. *National Fusion Collaboratory*, DOE $440,000 (Senior Personnel, Argonne), 2004-2006
7. *Grid Visualization*, DOE subcontract from Kitware Inc. $70,000 (PI, Argonne), 2004-2006
6. *Advanced Biomedical Collaboration Testbed in Surgery, Anesthesia, and Emergency Medicine (ABC Testbed)*, NIH $3,487,139 (Senior Personnel, UChicago) 2003-2006
5. *A Data Intense Challenge: The Instrumented Oilfield of the Future*, NSF (CNS-0121523) $1,461,005 PI: Wheeler@UTexas ($384,000 UChicago portion) (Senior Personnel, UChicago), 2002-2005
4. *Extensible Network Services for the Access Grid*, NSF (OAC-0222509) $900,000 (Co-PI, UChicago), 2002-2005
3. *Scientific Workspaces of the Future*, NSF subcontract via University of Illinois, $800,000 (Co-PI, Argonne), 2002-2004
2. *Advanced Display Work*, General Atomics Inc. $90,000 (PI, Argonne), 2002-2003
1. *Advanced Visualization Technology Center*, DOE $1,750,000 (Co-PI, Argonne), 1999-2002

SYNERGISTIC ACTIVITIES - LAST 10 YEARS

- **Distinguished Member:**
  - Association for Computing Machinery (ACM) - *For contributions in virtual reality, collaborative environments, scientific visualization, as well as research and operations in high performance computing.*
- **Senior Member:**
  - Institute of Electrical and Electronics Engineers (IEEE)
- **Member:**
  - American Association for the Advancement of Science (AAAS)
  - Computer Science Teachers Association (CSTA)
- **Steering Committee:** Symposium on Large Data Analysis and Visualization (2010 – 2019)
- **Area Curation Committee:** IEEE VIS (2022 - Present)
- **Program Committee:**
  - IEEE VIS: Visualization and Visual Analytics (2023 – Present)
  - Parallel AI and Systems for the Edge (2020 – Present)
  - The International Conference for High Performance Computing, Networking, Storage, and Analysis - Technical Program [Data Analytics, Visualization & Storage] (2018, 2023, 2024)
- **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)
- **General co-Chair:** IEEE Visualization 2015 (hosted in Chicago) with Maxine Brown (UIC)
- **Advisory Board Member:**
  - 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 – Present)
- **Editorial Board Member:** IEEE Computing in Science and Engineering (CiSE) (*Department Editor for Leadership Computing*) (2015 – 2020)
- **Internal Argonne National Laboratory**
  - **Executive Sponsor:** Argonne African American Employee Resource Group (2019 – Present)
- **Internal University of Illinois Chicago**

  - **Member:** Dean of Engineering Search Committee (2023 - 2024)
  - **Member:** Computer Science Computer Committee (2022 - Present)
- **Member:** University of Illinois – System Research Computing Advisory Committee (2024 – Present)

Advisees Graduation Dates in []

- **Current Postdocs:**
  - Shilpika (ANL)
- **Current Graduate Students:**
  - Marco Bonafini [M.S. Student [co-Advisor with Ian Kash (CS)]
  - Amy Byrnes [M.S. Student] C^2theP^2 Fellow
  - Hal Brynteson [M.S. Student]
  - Andrew Burks [Ph.D. Student]
  - Greg Cross [Ph.D. Student] [co-Advisor with Dan Schonfeld (ECE)]
  - Revathi Dhotre [M.S. Student]
  - Chris Grams [M.S. 2024, Ph.D. Student] [co-Advisor with Yu (Tom) Gao (PHAR)]
  - Sreten Kljaic [M.S. Student] C^2theP^2 Fellow
  - Yash Kurkure [Ph.D. Student]
  - Wesley Kwiecinski [M.S. Student] C^2theP^2 Fellow
  - Zhong Zheng [Ph.D. Student] [co-Advisor with Zhiling Lan (CS)]
- **Past Graduate Students:**
  - Riccardo Strina [M.S. 2024] (UIC) [co-Advisor with Zhiling Lan (UIC)]
  - Matteo Del Grossi [M.S. 2023] (UIC) [co-Advisor with Ian Kash (UIC)]
  - Boyang Li [Ph.D. 2023] (IIT) [co-Advisor with Zhiling Lan (IIT)]
  - Bharat Kale [M.S. 2018, Ph.D. 2023] (NIU) [co-Advisor for Ph.D. with Maoyuan Sun (NIU)]
  - 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 (NIU)]
  - 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 (IIT)]
  - 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 [Deputy Scientific Information Officer, NICHD]