Andrew J. Younge, Ph.D

CONTACT INFORMATION

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BIOGRAPHY

Dr. Andrew J. Younge is a Senior Member of Technical Staff in the Scalable System Software department at Sandia National Laboratories. His research interests include high performance computing, virtualization, distributed systems, and energy efficient supercomputing. The focus of his research is on improving the usability and efficiency of system software for supercomputing systems. Andrew currently serves as the Principal Investigator for the Supercontainers project under the DOE Exascale Computing Project and is a key contributor to the Astra system, the world's first supercomputer based on the Arm processor deployed under Sandia's Vanguard program. Prior to joining Sandia, Andrew held visiting positions at the MITRE Corporation, the University of Southern California's Information Sciences Institute, and the University of Maryland, College Park. He received his PhD in computer science from Indiana University in 2016 and his BS and MS in computer science from the Rochester Institute of Technology in 2008 and 2010, respectively.

CITIZENSHIP

USA

SECURITY CLEARANCE

[redacted]

RESEARCH INTERESTS

Distributed Systems, High Performance Computing, Cloud Computing, Containers & Virtualization, Energy Efficiency, Grid Computing, Computer Architecture

EDUCATION

Indiana University, Bloomington, Indiana USA

Ph.D, Computer Science — **Aug 2010 – Oct 2016**

- Dissertation: *Architectural Principles and Experimentation of Distributed High Performance Virtual Clusters*
- Advisor: Geoffrey C. Fox
- Committee Members: Judy Qiu, D. Martin Swany, Thomas Sterling

Rochester Institute of Technology, Rochester, New York USA

M.S., Computer Science — **Aug 2008 – May 2010**

- Thesis: *Towards a Green Framework for Cloud Data Centers*
- Advisor: Warren Carithers

B.S., Computer Science — **Aug 2004 – May 2008**

- Minor in Psychology

Experience

Sandia National Laboratories, Albuquerque, New Mexico USA

Senior Member of Technical Staff **Oct 2016 – present**

- Principal Investigator of Supercontainers Effort in U.S. Department of Energy's Exascale Computing Project.
- Technical Advisor for DOE/NNSA ASC Vanguard Astra & ATS Crossroads supercomputing procurements.
- Expert in containers, virtualization, OS & Runtime systems, HPC system software, and supercomputing energy efficiency.
- Member of DOE/NNSA ASC Advanced Technology Development and Mitigation (ATDM) and Computational Systems and Software Environment (CSSE) programs.
- Member of Scalable System Software department.

MITRE Corportation, McLean, Virginia USA

Senior Computer Scientist **Mar 2015 – Jun 2016**

- Member of the MITRE Corporation's Center for National Security.
- In J84B Simulation Engineering department, supporting the Live-Synthetic Training and Test Evaluation Enterprise Architecture efforts for the U.S. Army PEO STRI.
- Specialized in Cloud Computing strategies and techniques.

Indiana University, Bloomington, Indiana USA

Graduate Researcher & Fellowship **Apr 2010 – Oct 2016**

- Member of the Pervasive Technology Institute and Community Grids Laboratory under the direction of Dr. Geoffrey C. Fox.
- Researcher for the NSF FutureGrid project, a high-performance distributed cloud and grid testbed for advanced scientific research.
- Associate Instructor for Indiana University Computer Science Department classes CSCI-P434 - Distributed Systems and CSCI-B649 - Cloud Computing.
- System administrator of Bravo, Delta, India, Foxtrot, Romeo, and Sierra supercomputing and HPC clusters, along with OpenStack, Eucalyptus, and ScaleMP deployments.
- Collaborator on the Truthy project as SME for Big Data challenges within HPC.

USC Information Sciences Institute, Arlington, Virginia USA

Visiting Researcher **May – Aug 2012 & 2013**

- Researcher on the DODCS project, a heterogeneous high performance cloud computing system.
- Created High Performance GPGPU and InfiniBand IaaS cloud infrastructure using OpenStack and Xen.
- Researcher in virtualization performance, scalability, HPC systems, and GPGPU architectures.
- Visiting USC/ISI East from May 2012 to Aug 2012 and May 2013 to Aug 2013

Rochester Institute of Technology, Rochester, New York USA

Graduate Researcher **Jun 2008 – Mar 2010**

- Developed Green-Cloud Framework for next generation data centers.
- Helped coordinate other programming activities within the group.
- Architect and developer of Cyberaide effort, including Cyberaide Shell and Web Services layers.

- Mentor for Undergraduate students on Grid projects and coursework.
- Includes current M.S. research and course work.

Research Assistant - Psychology Department **Jun 2007 – Sep 2008**

- Managed computing aspects associated with a research project investigating how social rumors can propagate over time in the context of complex social networks.
- Upgraded and maintained current client-server experiment application in Java and developed support services in PHP and Python.

Student Lab Instructor **Jun 2005 – Sep 2006**

- Instructed labs for CS1 - CS4 courses and assisted in lectures under Professor Sean Strout.
- Provided tutoring sessions and held office hours at the Computer Science Tutoring Center.
- Designed and implemented a new CS2 class project.
- Created tutorials for software programs and set up various services used by incoming students.

University of Maryland, College Park, Maryland USA

Research Assistant - The Lattice Project **Nov 2006 – May 2007**

- Worked in the Laboratory for Molecular Evolution in the Center for Bioinformatics and Computational Biology under the direction of Michael P. Cummings.
- Developer for the Lattice Project, a Grid computing resource within the Center for Bioinformatics & Computational Biology.
- Designed and implemented a common interface between the main Grid system (Globus) and the Desktop Grid server (BOINC).
- Maintained the project, desktop grid, and lab websites.

Awards

DOE National Nuclear Security Administration

- NNSA Defense Programs Award of Excellence - Astra Supercomputer team **2019**
- Exceptional Achievement Award **2019**
- For significant contributions to the Stockpile Stewardship Program

Sandia National Laboratories

- Employee Recognition Award - Astra Supercomputer Team **2019**
- Up & Coming Innovator Award **2018**
- SPOT Recognition Award **2017**

R&D 100 Awards

- R&D 100 Award - Power API **2018**
- R&D 100 Special Recognition: Corporate Social Responsibility **2018**

Indiana University

- Persistent Systems Fellow - School of Informatics and Computing **2013 – 2016**
- Graduate Research Assistantship **2010 – 2013**
- Student Fellow at the Center for Applied Cybersecurity Research **2011**

Google

- GSoC Award - Deployment of DemoGrid on FutureGrid Resources. **2011**
- In conjunction with the Globus Alliance & Argonne National Laboratory

Rochester Institute of Technology

- Graduate Research Scholarship **2008 – 2010**
- Undergraduate Academic Scholarship **2006 – 2008**
- Deans List **2004 – 2008**

Publications

Scholarly Impact : H-Index: 16 — i10-Index: 20 — Citations: 2324 (Google Scholar)

* **Book Chapters and Journal Articles**

[1] R. D. Flournoy, A. R. LaFrenz, and **A. J. Younge**, "Streamserver for Fast Data Analytics," *The ITEA Journal of Test and Evaluation*, vol. 40, pp. 121–129, 2019.

[2] **A. J. Younge**, R. E. Grant, J. H. Laros III, M. Levenhagen, S. L. Olivier, K. Pedretti, and L. Ward, "Small scale to extreme: Methods for characterizing energy efficiency in supercomputing applications," *Sustainable Computing: Informatics and Systems*, vol. 21, pp. 90–102, 2019.

[3] C. A. Davis, G. L. Ciampaglia, L. M. Aiello, K. Chung, M. D. Conover, E. Ferrara, A. Flammini, G. C. Fox, X. Gao, B. Gonalves, P. A. Grabowicz, K. Hong, P.-M. Hui, S. McCaulay, K. McKelvey, M. R. Meiss, S. Patil, C. Peli Kankanamalage, V. Pentchev, J. Qiu, J. Ratkiewicz, A. Rudnick, B. Serrette, P. Shiralkar, O. Varol, L. Weng, T.-L. Wu, **A. J. Younge**, and F. Menczer, "Osome: the iuni observatory on social media," *PeerJ Computer Science*, vol. 2, p. e87, Oct. 2016.

[4] N. Keith, A. E. Tucker, C. E. Jackson, W. Sung, J. I. L. Lled, D. R. Schrider, S. Schaack, J. L. Dudycha, M. S. Ackerman, **A. J. Younge**, J. R. Shaw, and M. Lynch, "High mutational rates of large-scale duplication and deletion in daphnia pulex," *Genome Research*, 2015.

[5] N. DiFonzo, J. Suls, J. W. Beckstead, M. J. Bourgeois, C. M. Homan, S. Brougher, **A. J. Younge**, and N. Terpstra-Schwab, "Network structure moderates intergroup differentiation of stereotyped rumors," *Social Cognition*, vol. 32, no. 5, pp. 409–448, 2014.

[6] X. Gao, E. Roth, K. McKelvey, C. Davis, **A. J. Younge**, E. Ferrara, F. Menczer, and J. Qiu, "Supporting a Social Media Observatory with Customizable Index Structures-Architecture and Performance," in *Cloud Computing for Data Intensive Applications*, 2014.

[7] **A. J. Younge**, G. von Laszewski, L. Wang, and G. C. Fox, "Providing a Green Framework for Cloud Based Data Centers," in *The Handbook of Energy-Aware Green Computing*, I. Ahmad and S. Ranka, Eds. Chapman and Hall/CRC Press, 2012, vol. 2, ch. 17.

[8] N. Stupak, N. DiFonzo, **A. J. Younge**, and C. Homan, "SOCIALSENSE: Graphical User Interface Design Considerations for Social Network Experiment Software," *Computers in Human Behavior*, vol. 26, no. 3, pp. 365–370, May 2010.

[9] L. Wang, G. von Laszewski, **A. J. Younge**, X. He, M. Kunze, and J. Tao, "Cloud Computing: a Perspective Study," *New Generation Computing*, vol. 28, pp. 63–69, Mar 2010.

* **Conference and Workshop Proceedings**

[10] R. S. Canon and **A. J. Younge**, "A Case for Portability and Reproducibility of HPC Containers," in *1st International Workshop on Containers and New Orchestration Paradigms for Isolated Environments in HPC (CANOPIE-HPC) at Supercomputing 2019*. Denver, CO: IEEE, 2019.

[11] A. Beltre, P. Saha, M. Govindaraju, **A. J. Younge**, and R. E. Grant, "Enabling HPC workloads on Cloud Infrastructure using Kubernetes Container Orchestration Mechanisms," in *1st International Workshop on Containers and New Orchestration Paradigms for Isolated Environments in HPC (CANOPIE-HPC) at Supercomputing 2019*. Denver, CO: IEEE, 2019.

[12] J. Lofstead, J. Baker, and **A. J. Younge**, "Data Pallets: Containerizing Storage For Reproducibility and Traceability," in *14th Workshop on Virtualization in High-Performance Cloud Computing (VHPC'19) at ISC, 2019*, June 2019.

[13] S. Hammond, C. Hughes, M. Levenhagen, C. Vaughan, **A. J. Younge**, B. Schwaller, M. Aguilar, K. Pedretti, and J. Laros, "Evaluating the Marvell ThunderX2 Server Processor for HPC Workloads," in *The 6th Special Session on High Performance Computing Benchmarking and Optimization (HPBench 2019)*, 2019.

[14] A. M. Agelastos, **A. J. Younge**, G. F. Lofstead, A. Warren, and J. Lamb, "(U) Quantifying Metrics to Evaluate Containers for Deployment and Usage of NNSA Production Applications," in *Nuclear Explosive Code Development Conference (NECDC)*, 2018.

[15] K. Pedretti, R. E. Grant, J. H. L. III, M. Levenhagen, S. L. Olivier, L. Wardand, and **A. J. Younge**, "A Comparison of Power Management Mechanisms: P-states vs. Node-Level Power Cap Control," in *The 14th Workshop on High-Performance, Power-Aware Computing (HPPAC '18') at the 32nd International Parallel and Distributed Computing Symposium*, May 2018.

[16] **A. J. Younge**, K. Pedretti, R. E. Grant, and R. Brightwell, "A Tale of Two Systems: Using Containers to Deploy HPC Applications on Supercomputers and Clouds," in *2017 IEEE International Conference on Cloud Computing Technology and Science (CloudCom)*, Dec 2017, pp. 74–81.

[17] R. E. Grant, J. H. L. III, M. Levenhagen, S. L. Olivier, K. Pedretti, L. Ward, and **A. J. Younge**, "Evaluating Energy and Power Profiling Techniques for HPC Workloads," in *Eighth International Green and Sustainable Computing Conference (IGSC 17)*. IEEE, 2017.

[18] **A. J. Younge**, K. Pedretti, R. E. Grant, and R. Brightwell, "Enabling Diverse Software Stacks on Supercomputers using High Performance Virtual Clusters," in *Proceedings of the 2017 IEEE International Conference on Cluster Computing (Cluster 2017)*. IEEE, 2017.

[19] **A. J. Younge**, C. Reidy, R. Henschel, and G. C. Fox, "Evaluation of SMP Shared Memory Machines for Use With In-Memory and OpenMP Big Data Applications," in *IEEE International Workshop on High-Performance Big Data Computing at the 30th IEEE International Parallel and Distributed Processing Symposium*, 2016.

[20] **A. J. Younge**, J. P. Walters, S. P. Crago, and G. C. Fox, "Supporting high performance molecular dynamics in virtualized clusters using iommu, sr-iov, and gpudirect," in *Proceedings of the 11th ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments*, ser. VEE '15. ACM, 2015, pp. 31–38.

[21] J. P. Walters, **A. J. Younge**, D.-I. Kang, K.-T. Yao, M. Kang, S. P. Crago, and G. C. Fox, "GPU-Passthrough Performance: A Comparison of KVM, Xen, VMWare ESXi, and LXC for CUDA and OpenCL Applications," in *Proceedings of the 7th IEEE International Conference on Cloud Computing (CLOUD 2014)*, IEEE. Anchorage, AK: IEEE, 06/2014 2014.

[22] M. Musleh, V. Pai, J. P. Walters, **A. J. Younge**, and S. P. Crago, "Bridging the Virtualization Performance Gap for HPC using SR-IOV for InfiniBand," in *Proceedings of the 7th IEEE International Conference on Cloud Computing (CLOUD 2014)*, IEEE. Anchorage, AK: IEEE, 06/2014 2014.

[23] **A. J. Younge** and G. C. Fox, "Advanced Virtualization Techniques for High Performance Cloud Cyberinfrastructure," in *Doctoral Symposium at 14th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid 2014)*, IEEE. Chicago, IL: IEEE, 05/2014 2014.

[24] **A. J. Younge**, J. P. Walters, S. Crago, and G. C. Fox, "Evaluating GPU Passthrough in Xen for High Performance Cloud Computing," in *High-Performance Grid and Cloud Computing Workshop at the 28th IEEE International Parallel and Distributed Processing Symposium*, IEEE. Pheonix, AZ: IEEE, 05/2014 2014.

[25] J. Diaz, G. von Laszewski, F. Wang, **A. J. Younge**, and G. C. Fox, "FutureGrid Image Repository: A Generic Catalog and Storage System for Heterogeneous Virtual Machine Images," in *Proceedings of Third IEEE International Conference on Coud Computing Technology and Science (CloudCom2011)*, IEEE. Athens, Greece: IEEE, 12/2011 2011.

[26] G. von Laszewski, J. Diaz, F. Wang, **A. J. Younge**, A. Kulshrestha, and G. Fox, "Towards generic FutureGrid image management," in *Proceedings of the 2011 TeraGrid Conference: Extreme Digital Discovery*, ser. TG '11. Salt Lake City, UT: ACM, 2011, pp. 15:1–15:2.

[27] **A. J. Younge**, R. Henschel, J. T. Brown, G. von Laszewski, J. Qiu, and G. C. Fox, "Analysis of Virtualization Technologies for High Performance Computing Environments," in *Proceedings of the 4th International Conference on Cloud Computing (CLOUD 2011)*. Washington, DC: IEEE, July 2011.

[28] **A. J. Younge**, V. Periasamy, M. Al-Azdee, W. Hazlewood, and K. Connelly, "ScaleMirror: A Pervasive Device to Aid Weight Analysis," in *Proceedings of the 29h International Conference Extended Abstracts on Human Factors in Computing Systems (CHI2011)*. Vancouver, BC: ACM, May 2011.

[29] J. Diaz, **A. J. Younge**, G. von Laszewski, F. Wang, and G. C. Fox, "Grappling Cloud Infrastructure Services with a Generic Image Repository," in *Proceedings of Cloud Computing and Its Applications (CCA 2011)*, Argonne, IL, Mar 2011.

[30] G. von Laszewski, G. C. Fox, F. Wang, **A. J. Younge**, A. Kulshrestha, and G. Pike, "Design of the FutureGrid Experiment Management Framework," in *Proceedings of Gateway Computing Environments 2010 at Supercomputing 2010*. New Orleans, LA: IEEE, Nov 2010.

[31] **A. J. Younge**, G. von Laszewski, L. Wang, S. Lopez-Alarcon, and W. Carithers, "Efficient Resource Management for Cloud Computing Environments," in *Proceedings of the International Conference on Green Computing*. Chicago, IL: IEEE, Aug 2010.

[32] N. DiFonzo, M. J. Bourgeois, J. M. Suls, C. Homan, **A. J. Younge**, N. Schwab, M. Frazee, S. Brougher, and K. Harter, "Network Segmentation and Group Segregation Effects on Defensive Rumor Belief Bias and Self Organization," in *Proceedings of the*

George Gerbner Conference on Communication, Conflict, and Aggression, Budapest, Hungary, May 2010.

[33] G. von Laszewski, L. Wang, **A. J. Younge**, and X. He, "Power-Aware Scheduling of Virtual Machines in DVFS-enabled Clusters," in *Proceedings of the 2009 IEEE International Conference on Cluster Computing (Cluster 2009)*. New Orleans, LA: IEEE, Sep 2009.

[34] G. von Laszewski, **A. J. Younge**, X. He, K. Mahinthakumar, and L. Wang, "Experiment and Workflow Management Using Cyberaide Shell," in *Proceedings of the 4th International Workshop on Workflow Systems in e-Science (WSES 09) with 9th IEEE/ACM International Symposium on Cluster Computing and the Grid (CCGrid 09)*. IEEE, May 2009.

[35] L. Wang, G. von Laszewski, J. Dayal, X. He, **A. J. Younge**, and T. R. Furlani, "Towards Thermal Aware Workload Scheduling in a Data Center," in *Proceedings of the 10th International Symposium on Pervasive Systems, Algorithms and Networks (ISPAN2009)*, Kao-Hsiung, Taiwan, Dec 2009.

[36] G. von Laszewski, F. Wang, **A. J. Younge**, X. He, Z. Guo, and M. Pierce, "Cyberaide JavaScript: A JavaScript Commodity Grid Kit," in *Proceedings of the Grid Computing Environments 2007 at Supercomputing 2008*. Austin, TX: IEEE, Nov 2008.

[37] G. von Laszewski, F. Wang, **A. J. Younge**, Z. Guo, and M. Pierce, "JavaScript Grid Abstractions," in *Proceedings of the Grid Computing Environments 2007 at Supercomputing 2007*. Reno, NV: IEEE, Nov 2007.

* **Technical Reports**

[38] J. H. L. III, K. T. Pedretti, S. D. Hammond, **A. J. Younge**, M. L. Curry, P. T. Lin, and C. T. Vaughan, "(U) FY19 L2 Milestone Report: Astra Acceptance and Software Environment Development," Sandia National Laboratories, Tech. Rep., 2019.

[39] R. Priedhorsky and **A. J. Younge**, "Containers in HPC: Best practices and pitfalls for users," Los Alamos National Laboratory, Tech. Rep., 2019.

[40] J. H. Laros, K. Pedretti, S. D. Hammond, M. J. Aguilar, M. L. Curry, R. Grant, R. J. Hoekstra, R. A. Klundt, S. T. Monk, J. B. Ogden, S. L. Olivier, R. D. Scott, H. L. Ward, and **A. J. Younge**, "(U) FY18 L2 Milestone Report: Vanguard Astra and ATSE: an ARM-based Advanced Architecture Prototype System and Software Environment," Sandia National Laboratories, Tech. Rep., 2018.

[41] S. Green, V. J. Leung, K. Pedretti, C. M. Vineyard, and **A. J. Younge**, "(U) Machine Learning Impacts on High Performance Computing," Sandia National Laboratories, Tech. Rep., 2018.

[42] R. E. Grant, J. H. Laros III, M. Levenhagen, S. L. Olivier, K. Pedretti, L. Ward, and **A. J. Younge**, "(U) FY17 CSSE L2 Milestone Report: Analyzing Power Usage Characteristics of Workloads Running on Trinity," Sandia National Laboratories, Tech. Rep., 2017.

* **Poster Sessions**

[43] **A. J. Younge** and G. Fox, "High Performance Molecular Dynamics in Cloud Infrastructure with SR-IOV & GPUDirect," Poster at the International Supercomputing Conference, Jun 2016.

[44] **A. J. Younge** and G. C. Fox, "Advanced Virtualization Techniques for High Performance Cloud Cyberinfrastructure," Poster session at 14th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid 2014), Chicago, IL, 05/2014 2014.

[45] **A. J. Younge**, J. T. Brown, R. Henschel, J. Qiu, and G. C. Fox, "Performance Analysis of HPC Virtualization Technologies within FutureGrid," Emerging Research at CloudCom 2010, Dec 2010.

[46] **A. J. Younge**, X. He, F. Wang, L. Wang, and G. von Laszewski, "Towards a Cyberaide Shell for the TeraGrid," Poster at TeraGrid Conference, Jun 2009.

[47] **A. J. Younge**, F. Wang, L. Wang, and G. von Laszewski, "Cyberaide Shell Prototype," Poster at ISSGC 2009, Jul 2009.

* **Thesis**

[48] **A. J. Younge**, "Architectural Principles and Experimentation of Distributed High Performance Virtual Clusters," Ph.D. dissertation, Indiana University, Oct 2016.

[49] **A J. Younge**, "Towards a Green Framework for Cloud Data Centers," Master's thesis, Rochester Institute of Technology, May 2010.

Presentations

[1] SC19 BOF: Containers in HPC, Supercomputing, Nov 2019

[2] SC19 BOF: The Extreme-scale Scientific Software Stack and Supercontainers, Supercomputing, Nov 2019

[3] Astra and the state of ARM in HPC, RIKEN Booth at Supercomputing, Nov 2019

[4] A Case for Portability and Reproducibility of HPC Containers, CANOPIE-HPC Workshop at Supercomputing, Nov 2019

[5] Advancing the Usage and Scalability of Containers in HPC, DOE Booth at Supercomputing, Nov 2019

[6] Getting Started with Containers on HPC, Tutorial at Supercomputing, Nov 2019

[7] Packaging Technologies: WBS 2.3.5.09, DOE Exascale Computing Project Review Committee, Sep 2019

[8] Supercontainers in HPC, E4S Workshop at IEEE Cluster, Sep 2019

[9] Containers, Programming Environments, and ARM: oh my, Arm Research Summit, Sep 2019

[10] Containers in HPC, NSF/DOE Workshop, Jul 2019

[11] Containers in HPC and Beyond, NNSA/CEA DAM Meeting, Jul 2019

[12] Getting Started with Containers on HPC, Tutorial session at the International Supercomputing Conference, 2019

[13] (U) Supercontainers for HPC, Sandia National Laboratories, May 2019

[14] Containers in HPC and Beyond, Software Engineering Assembly, Apr 2019

[15] Vanguard Astra - Petascale ARM Platform for U.S. DOE/ASC Supercomputing, Linaro Connect, Apr 2019

[16] From Containerizing Testbeds for HPC Applications to Exascale Supercontainers, Singularity User Group, Mar 2019

[17] (U) Deployment and Usage of Containers for Production HPC Applications, NNSA/AWS JOWOG 34, Jan 2019

[18] Containers in HPC, and Beyond, ECP Annual Meeting, Jan 2019

[19] SC18 BOF: Containers in HPC, Supercomputing, Nov 2018

[20] SC18 BOF: Grappling with HPC Architecture Diversity in Containers, Supercomputing, Nov 2018

[21] SC18 BOF: Vanguard Astra: A Prototype Petascale Arm Supercomputer, Supercomputing, Nov 2018

[22] (U) Quantifying Metrics to Evaluate Containers for Deployment and Usage of NNSA Production Applications - Nuclear Explosive Code Developer Conference, Nov 2018

[23] Vanguard Astra - Petascale ARM Platform for U.S. DOE/ASC Supercomputing, Linaro Connect HPC SIG, Jul 2018

[24] Leveraging Containerization for DevOps withSandiaśHPC Workloads, NITRD MAGIC Meeting, Jul 2018

[25] HPC at Sandia:Exploring the Virtualization and Containerization of ARM Processors for Future HPC Workloads, Keynote at VHPC Workshop, International Supercomputing Conference, Jun 2018.

[26] Supporting High Performance Analytics with System Software for Virtualized Supercomputing, NNSA/CEA Meeting, Jun 2018

[27] Portals 4: Status of Specification and Implementation, NNSA/CEA Meeting, Jun 2018

[28] Advanced Power Measurement and Control for the Trinity Supercomputer, European HPC Infrastructure Workshop, May 2018

[29] Supporting High Performance Analytics with System Software for Virtualized Supercomputing, Indiana HPSA Workshop, Apr 2018

[30] A Tale of Two Systems: Using Containers to Deploy HPC Applications on Supercomputers and Clouds, IEEE CloudCom, Dec 2017

[31] SC17 BOF: Containers for HPC, Supercomputing, Nov 2017

[32] Evaluating Energy and Power Profiling Techniques for HPC Workloads, IEEE IGSC, Oct 2017

[33] Project Vanguard: Prototyping a large-scale ARM-based HPC platform, Linaro SFO 17, Sep 2017

[34] Enabling Diverse Software Stacks on Supercomputers using High Performance Virtual Clusters, IEEE Cluster 2017, Sep 2017

[35] Initial Experiences with Deploying Singularity on a Cray XC Supercomputer, VHPC Workshop, International Supercomputing Conference, Jun 2017

[36] Architectural Principles and Experimentation of Distributed High Performance Virtual Clusters, Indiana University PhD Defense, Oct 2016

[37] Architectural Principles and Experimentation of Distributed High Performance Virtual Clusters, Lawrence Berkeley National Laboratory, Jul 2016

[38] High Performance Molecular Dynamics in Cloud Infrastructure with SR-IOV & GPUDirect, International Supercomputing Conference, Jun 2016

[39] Evaluation of SMP Shared Memory Machines for Use With In-Memory and OpenMP Big Data Applications, High Performance Big Data Computing Workshop, IPDPS, May 2016

[40] Architectural Principles and Experimentation of Distributed High Performance Virtual Clusters, Sandia National Laboratories, Apr 2016

[41] Supporting High Performance Molecular Dynamics in Virtualized Clusters using IOMMU, SR-IOV, and GPUDirect, Virtual Execution Environments, Mar 2015

[42] Building High Performance Cloud Infrastructure to Support Molecular Dynamics Simulations, MITRE Corporation, Jan 2015

[43] Advanced Virtualization Techniques for High Performance Cloud Cyberinfrastructure, Indiana University, Aug 2014

[44] GPU Passthrough Performance: A Comparison of KVM, Xen, VMWare ESXi, and LXC for CUDA and OpenCL Applications, IEEE CLOUD, Jun 2014

[45] Advanced Virtualization Techniques for High Performance Cloud Cyberinfrastructure, IEEE CCGrid, May 2014

[46] Evaluating GPU Passthrough in Xen for High Performance Cloud Computing, HPGC Workshop, IPDPS, May 2014

[47] ScaleMP at Indiana University, ScaleMP Booth at Supercomputing 2013, Nov 2013

[48] Towards Constructing High Performance Cloud Infrastructure, University of Southern California, Aug 2013

[49] The State of Cloud Computing in Distributed Systems, Indiana University, Qualification Exam, Nov 2012

[50] Towards GPUs on Cloud Infrastructure, Science Cloud Summer School, Aug 2012

[51] FutureGrid: A Cloudy HPC Testbed, University of Southern California, Seminar Series, Jul 2012

[52] Using HPC, IaaS, and Hadoop within FutureGrid, TeraGrid Conference, Jul 2011

[53] Analysis of Virtualization Technologies for High Performance Computing Environments, IEEE CLOUD, Jul 2011

[54] FutureGrid, IEEE CCGrid 2011, May 2011

[55] Creating Research Posters, Indiana University, Apr 2011

[56] A Tutorial on the FutureGrid Project, IEEE CloudCom 2010, Dec 2010

[57] The FutureGrid Project, IU Booth at Supercomputing 2010, Nov 2010

[58] Efficient Resource Management for Cloud Computing Environments, IGCC, Aug 2010

[59] Towards a Green Framework for Cloud Data Centers, Rochester Institute of Technology, May 2010

[60] Towards Efficiency Enhancements in Cloud Computing, Fermi National Accelerator Laboratory, Mar 2010

[61] Security Threats to Mobile Devices, Rochester Institute of Technology, Feb 2010

[62] Overview of the NIST SHA-3 Hash Contest, Rochester Institute of Technology, Jan 2010

[63] Towards a Green Framework for Cloud Data Centers, Purdue University, Jan 2010

[64] Simple Classification Performs Well on Most Commonly Used Datasets, Rochester Institute of Technology, Dec 2009

[65] Power Aware Scheduling in DVFS-Enabled Clusters, IEEE Cluster, Sep 2009

[66] Efficient Resource Management for Cloud Computing Environments, Rochester Institute of Technology, May 2009

[67] Grid Deployments and Cyberinfrastructure, Rochester Institute of Technology, Dec 2008

[68] Introduction to BOINC, Bar Camp Rochester, Apr 2008

[69] Overview of the Globus Toolkit Version 4, Rochester Institute of Technology, Mar 2008

Service

[1] Derivative Classifier, US Department of Energy, 2019

[2] L2 Milestone Review Committee Member, ASC LANL Milestone #6765: (U) Container Environments for Production Applications with Complex Workflows, 2019

[3] Co-chair and Founder, CANOPIE-HPC: 1st International Workshop on Containers and New Orchestration Paradigms for Isolated Environments in HPC at SC19, 2019.

[4] Co-chair, Workshop on Virtualization in High Performance Cloud Computing (VHPC), 2019

[5] Program Committee Member, HPC Asia, 2019

[6] Program Committee Member, Special Session on Virtualization in High Performance Computing and Simulation (VIRT), 2018 - 2019

[7] Reviewer, Cluster Computing, 2018 - 2019

[8] Reviewer, IEEE Transactions on Parallel and Distributed Computing, 2012, 2019

[9] Reviewer, IEEE Transactions on Cloud Computing, 2019

[10] Reviewer, IEEE Access, 2019

[11] Ph.D Forum Program Committee Member, International Symposium on High-Performance Parallel and Distributed Computing (HPDC), 2018

[12] Program Committee Member, Workshop on High-Performance, Power-Aware Computing (HPPAC), 2018

[13] Program Committee Member, International Workshop on Infrastructure for Workflows and Application Composition (IWAC), 2018

[14] Program Committee Member, Workshop on Virtualization in High Performance Cloud Computing (VHPC), 2017 - 2018

[15] Reviewer, Journal of Parallel Computing, 2018

[16] Reviewer, IEEE Transactions on Multi-Scale Computing Systems, 2018

[17] eviewer, IEEE Transactions on Services Computing, 2015, 2018

[18] Poster Reviewer, The International Conference for High Performance Computing, Networking, Storage and Analysis (Supercomputing), 2017

[19] Program Committee Member, International Workshop on Energy Efficient Supercomputing (E2SC), 2017

[20] Programm Committee Member, Symposium on High Performance Interconnects (HotI), 2017

[21] Reviewer, IEEE International Conference on High Performance Computing and Communications (HPCC), 2017

[22] Reviewer, The Journal of Supercomputing, 2010, 2014 - 2015, 2017

[23] Reviewer, IEEE Transactions on Network and Service Management, 2016

[24] Reviewer, Concurrency and Computation: Practice and Experience, 2010, 2012 - 2015

[25] Reviewer, Journal of Systems and Software. 2012, 2014, 2015

[26] Reviewer, Simulation Modeling Practice and Theory, 2015

[27] Associate Instructor, Computer Science - P434 Distributed Systems, 2014, 2015

[28] Reviewer, IEEE Transactions on Network and Service Management, 2014

[29] Reviewer, 15th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid), 2015

[30] Reviewer, IEEE Cloud Computing, 2014

[31] Reviewer, Simulation Modelling Practice and Theory, 2014

[32] Reviewer, Sustainable Computing, 2014

[33] Reviewer, Computing, 2014

[34] Reviewer, 14th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid), 2014

[35] Reviewer, International Journal of Risk Assessment and Management, 2013 - 2014

[36] Committee Member, Indiana Statewide IT Conference, 2013, 2014

[37] SCinet Volunteer, Supercomputing Conference (SC), 2009, 2012 - 2013

[38] Reviewer, Parallel and Cloud Computing Research, 2013

[39] Reviewer, International Journal of Computational Science and Engineering, 2012 - 2013

[40] Graduate Mentor, Indiana University Research Methods INFO-I399, 2011 - 2012

[41] Editorial Board Member, Journal of Cloud Computing Advances, Systems and Applications, 2010 - 2011

[42] Reviewer, Journal of Network and Systems Management, 2011

[43] Student Volunteer, IEEE CloudCom, 2010

[44] ISCnet Volunteer, International Supercomputing Conference, 2009 - 2010

[45] Student Volunteer, IEEE Cluster Computing, 2009

Technical Skills

Programming Languages: Python, Java, C, C++, C#, PHP, Perl, x86 Assembly Language, VHDL, Bash

Other Languages: SQL, XML, JSON, HTML

Software Development Tools: VI, Eclipse, Matlab, xCode, Visual Studio, Emacs

Operating Systems: All GNU/Linux distros with specialization in Red Hat & Debian variants, Apple OS X, Solaris, FreeBSD, Microsoft Windows 8/7/Server2008/XP/2000

Authoring Applications: LaTeX, Microsoft Office, OpenOffice