PHILIP C. ROTH

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EXPERIENCE

- Research and Development Staff Member, Center for Computational Sciences, Oak Ridge National Laboratory (ORNL), 2018–present. Analyzing and optimizing performance of applications targeting systems deployed by the Oak Ridge Leadership Computing Facility (OLCF) and other U.S. Department of Energy (DOE) computing centers.

- Research and Development Staff Member, Computer Science and Mathematics Division (CSMD), Oak Ridge National Laboratory, 2004–2018. Investigated techniques for performance analysis and application characterization, with emphasis on large scale parallel computation. Performance engineer for several fusion and fission SciDAC-3 and SciDAC-4 application partnership projects. Principal investigator for:
  - "An Evaluation of the Performance of Functional Programming for Extreme Scale Computing" (2014–2016), Exploratory Research for Extreme-Scale Science program of DOE Office of Advanced Scientific Computing Research (ASCR)
  - ORNL Lab Director's Research and Development fund project (2005–2007) titled "Exploring Automated Performance Tools for Petascale Systems with Lightweight Compute Node Kernels"

  Co-Principal Investigator for:
  - Institute for Sustained Performance, Energy, and Resilience (SUPER) project (2016–2017), DOE Office of Science's Scientific Discovery through Advanced Computing (SciDAC) program
  - Performance Engineering Research Institute (PERI) project (2010–2011), ASCR SciDAC program
  - "Building a Community Infrastructure for Scalable On-Line Performance Analysis Tools Around Open|-SpeedShop" (2009–2011), ASCR Software Development Tools for Improved Ease-of-Use of Petascale System program
  - Petascale Data Storage Institute project (2006–2010) in the ASCR SciDAC program
  - "A Path to Operating System and Runtime Support for Extreme Scale Tools" (2008–2010), ASCR FASTOS program

  Primary maintainer of Future Technology group's Experimental Computing Laboratory until early 2017. Mentored one postdoc, several summer interns, and visiting students. Servced as CSMD representative to Computer and Computational Science Directorate's operations council 2010–2012.

- Research Assistant, Paradyn Project, University of Wisconsin, 1998–2004. Focused on improving the scalability of automated performance diagnosis. Developed and evaluated the Distributed Performance Consultant, an on-line automated approach for performance diagnosis. Part of team that developed and evaluated the MRNet scalable tool infrastructure. Developed and evaluated MRNet-based scalable performance diagnosis and performance diagnosis results visualization techniques.

- Software Developer, MCSB Technology (formerly known as CHEN Systems Corp. and SuperComputing Intl.), 1994–1998. Developed UnixWare and Windows system administration tools for award-winning CHEN 1000 server system.

- Research Assistant, Pablo Project, University of Illinois at Urbana-Champaign, 1992–1994. Developed method for reducing event trace data volume using statistical data clustering. Developed new user interface components for the Pablo performance tool.

- Undergraduate Research Assistant, ECE Parallel Processing Laboratory, University of Iowa, 1990-1992. Contributed to development of timed Petri net simulation tool.

- Undergraduate Research Assistant, Physics Department, University of Iowa, 1988–1990. Assisted in deployment of high energy particle detector at Fermi National Accelerator Laboratory, Summer 1990.

EDUCATION

- Ph.D. in Computer Science, University of Wisconsin, Madison, WI, 2005. Thesis "Scalable On-line Automated Performance Diagnosis" supervised by Prof. Barton P. Miller. Minor in Business. GPA 3.9/4.
- M.S. in Computer Science, University of Illinois at Urbana-Champaign, Urbana, IL, 1996. Thesis "ETRUSCA: Event Trace Reduction Using Statistical Data Analysis" supervised by Prof. Daniel A. Reed. GPA 4.9/5.
- B.S. in Computer Science and Mathematics with highest distinction, University of Iowa, Iowa City, IA, 1992. GPA 4.0/4.

SELECTED PUBLICATIONS

1. P. C. Roth. "Improved Accuracy for Automated Communication Pattern Characterization Using Communication Graphs and Aggressive Search Space Pruning". In: *Proceedings of the 6th Workshop on Extreme-Scale Programming Tools (ESPT'17)*. Denver, Colorado, USA, Nov. 2017. To be published as Lecture Notes in Computer Science 11027, 2018.
2. P. C. Roth, H. Shan, D. Riegner, N. Antolin, S. Sreepathi, L. Oliker, S. Williams, S. Moore, and W. Windl. "Performance Analysis and Optimization of the RAMPAGE Metal Alloy Potential Generation Software". In: *Proceedings of the 4th ACM SIGPLAN International Workshop on Softwaer Engineering for Parallel Systems (SEPS'17)*. Vancouver, British Columbia, Canada, Oct. 2017.
3. W. Xie, Y. Chen, and P. C. Roth. "Parallel-DFTL: a Flash Translation Layer That Exploits Internal Parallelism in Solid State Drives". In: *Proceedings of the 11th IEEE International Conference on Networking, Architecture, and Storage (NAS'16)*. Long Beach, California, USA, Aug. 2016. *Best Paper Award nominee.*
4. P. C. Roth, J. S. Meredith, and J. S. Vetter. "Automated Characterization of Parallel Application Communication Patterns". In: *Proceedings of the 24th International Symposium on High-Performance Parallel and Distributed Computing*. HPDC '15. Portland, Oregon, USA, 2015, pp. 73–84.
5. P. C. Roth and J. S. Meredith. "Value Influence Analysis for Message Passing Applications". In: *Proceedings of the 28th ACM International Conference on Supercomputing*. ICS '14. Munich, Germany, 2014, pp. 145–154.
6. P. C. Roth. "Tracking a value's influence on later computation". In: *Proceedings of the 6th Workshop on Productivity and Performance (PROPER 2013)*. Aachen, Germany, Aug. 2013.
7. J. S. Meredith, P. C. Roth, K. L. Spafford, and J. S. Vetter. "Performance Implications of Non-Uniform Device Topologies in Scalable Heterogeneous Architectures". In: *IEEE Micro* 31.5 (2011), pp. 66–75.
8. P. C. Roth and B. P. Miller. "On-line automated performance diagnosis on thousands of processes". In: *Proceedings of the eleventh ACM SIGPLAN symposium on Principles and practice of parallel programming*. PPoPP '06. New York, New York, USA, 2006, pp. 69–80.

9. P. C. Roth, D. C. Arnold, and B. P. Miller. "MRNet: A Software-Based Multicast/Reduction Network for Scalable Tools". In: *Proceedings of the 2003 International Conference for High Performance computing, Networking, Storage and Analysis*. Phoenix, Arizona, USA, 2003, 21–36. *Best Student Paper award nominee*.
10. P. C. Roth and B. P. Miller. "Deep Start: A Hybrid Strategy for Automated Performance Problem Searches". In: *Proceedings of the 8th International Euro-Par Conference on Parallel Processing*. Euro-Par '02. Paderborn, Germany, 2002, pp. 86–96.

PROFESSIONAL ACTIVITIES

- Organizing Committee Memberships:
  - SC: Executive Director 2017; Tutorials chair 2016; Security chair 2015; Signage chair 2014; Birds of a Feather chair 2013; Awards vice chair 2012; Posters co-chair 2011
  - 23rd International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS'18) workshop co-chair
  - International Workshop on Data Intensive Scalable Computing Systems (DISCS) general chair 2015, program committee co-chair 2013–2014, program committee 2012
- Selected Program Committee Memberships:
  - SC: Technical papers 2006, 2007, 2010, 2013; posters 2005, 2012, 2013, 2014; dissertation research showcase 2012
  - International Workshop on Data Intensive Scalable Computing Systems (DISCS) 2012
  - International Conference on Supercomputing (ICS) 2011, 2013, 2014
  - International Conference on Parallel Processing (ICPP) 2007, 2010, 2018 Proceedings Chair
  - International Conference on Parallel and Distributed Systems (ICPADS) 2010
  - IEEE International Conference on Cluster Computing (Cluster) 2010, 2015, 2016
  - International Parallel and Distributed Processing Symposium (IPDPS) 2011, 2012
  - International LCI Conference on Clustered Computing 2007–2010
  - International Conference on High Performance Computing and Communications (HPCC) 2006, 2007
  - Symposium on High-Performance Parallel and Distributed Computing (HPDC) 2011
  - International Workshop on High-Level Programming Models and Supportive Environments (HIPS) 2008–2010, 2016
  - International Workshop on Scalable Tools for High-End Computing (STHEC) 2008
  - Petascale/Parallel Data Storage Workshop (PDSW) steering committee 2010–present, program committee 2007–2009
  - Workshop on Parallel Software Tools and Tool Infrastructures (PSTI) 2011, 2013
- Editor:
  - Parallel Computing, Systems & Applications, Guest Editor, 2017, 2014
  - International Journal of High Performance Computing Applications, Subject Area Editor, 2015
- Reviewer:
  - DOE Small Business Innovation Research (SBIR)
  - NSF Review Panel
  - IEEE Transactions on Parallel and Distributed Systems (TPDS), 2009, 2016
  - Cluster Computing, 2016
  - Journal of Parallel and Distributed Computing (JPDC), 2014

  - Concurrency and Computation: Practice and Experience, 2009
  - DOE INCITE technical readiness, FY2007–FY2009
  - International Journal on High Performance Computing Applications, 2008
  - Parallel and Distributed Computing Practices, 2001

- Member of IEEE Computer Society, ACM, and ACM SIGHPC.

AWARDS AND HONORS

- Best Paper Award nominee, IEEE NAS'16
- ORNL CSMD Award for Most Distinguished Software Released in the Last Five Fiscal Years for the Scalable HeterOgeneous Computing benchmark suite (SHOC), 2013
- Best Student Paper Award nominee, SC2003
- University of Wisconsin, Madison Graduate Student Council Vilas Travel Fellowship, 2003
- Honorable Mention, National Science Foundation Graduate Fellowship, 1992–1993
- Barry M. Goldwater Scholarship winner, 1990-1992
- University of Iowa Ernest R. Johnson Memorial Prize (awarded to College of Liberal Arts graduates with the highest and second highest GPA), 1992
- National Merit Scholar, 1988–1992
- Phi Beta Kappa

REFERENCES

Dr. David E. Bernholdt
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