

Daniel G. Chavarría-Miranda

Team Leader

High Performance Computing

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Education

Rice University, Computer Science, M.S./Ph.D, 2004. (Advisor: John Mellor-Crummey)

Instituto Tecnológico y de Estudios Superiores de Monterrey, Computer Science, M.S., 1998.

Universidad de Costa Rica, Computer Science, B.S., 1994.

Professional Appointments

Team Leader, High Performance Computing, Pacific Northwest National Laboratory (PNNL), Oct. 2007 -

Senior Research Scientist, Pacific Northwest National Laboratory (PNNL), Jan. 2005 -

Postdoctoral Research Associate, Rice University, Jan. 2004 – Jan. 2005

Honors and Awards

Best paper award: 2002 International Parallel and Distributed Processing Symposium (IPDPS'02)

Best student paper award: 11th International Conference on Parallel Architectures and Compilation Techniques (PACT'02)

Research Interests

Parallel and distributed systems, compilers for high-performance and parallel computing, reconfigurable computing, programming languages, interactions of architectural features with software systems.

Professional Experience

Participated in designing and developing key portions of Rice University's dHPF research compiler (1999-2005); currently participating in the DOE Office of Science Center for Technology for Advanced Scientific Component Software (TASCS) as well as in the Center for Scalable Parallel Programming Models; collaborator in the DOE Office of Science BioPilot project; Principal Investigator for several PNNL-funded Laboratory Directed Research & Development (LDRD) projects in the application of reconfigurable and hybrid systems to scientific applications; collaborator in PNNL-funded LDRD projects in the application of multithreaded systems to non-traditional scientific applications.

Publications

G. Chin Jr., G. Nakamura, H. Sofia and D. Chavarría-Miranda. "Graph Mining of Networks from Genome Biology", to appear in *Proceedings of the 7th IEEE International Symposium on Bioinformatics and Bioengineering (BIBE'07)*, Boston, MA, October 2007.

L.C. McInnes, T. Dahlgren, J. Nieplocha, D. Bernholdt, B. Allan, R. Armstrong, D. Chavarría-Miranda, W. Elwasif, I. Gorton, J. Kenny, M. Krishnan, A. Malony, B. Norris, J. Ray and S. Shende. "Research Initiatives for Plug-and-Play Scientific Computing", in *Journal of Physics: Conference Series*, vol. 78, August 2007.

G. Chin Jr., D. Chavarría-Miranda, G. Nakamura and H. Sofia. "A High-Performance Computational Framework for Bionetwork Analysis", to appear in *Proceedings of the IEEE Symposium of Computations in Bioinformatics and Bioscience (SCBB'07)*, Iowa City, IA, August 2007.

- D. Chavarría-Miranda and A. Márquez. “Assessing the Potential of Hybrid HPC Systems for Scientific Applications: A Case Study”, in *Proceedings of the ACM International Conference on Computing Frontiers (CF'07)*, Ischia, Italy, May 2007.
- J. Nieplocha, A. Márquez, J. Feo, D. Chavarría-Miranda, G. Chin, C. Scherrer, and N. Beagley. “Evaluating the Potential of Multithreaded Platforms for Irregular Scientific Computations”, in *Proceedings of the ACM International Conference on Computing Frontiers (CF'07)*, Ischia, Italy, May 2007.
- I. Gorton, D. Chavarría-Miranda, M. Krishnan and J. Nieplocha. “A High-performance Event Service for HPC Applications”, in *Third International Workshop on Software Engineering for High-Performance Computing (SEHPC'07)*, Minneapolis, MN, May 2007.
- C. Scherrer, N. Beagley, J. Nieplocha, A. Márquez, J. Feo and D. Chavarría-Miranda. “Probability Convergence in a Multithreaded Counting Application”, in *First Workshop on Multithreaded Architectures and Applications (MTAAP'07)*, Long Beach, CA, March 2007.
- D. Chavarría-Miranda and A. Márquez. “Implementing Scientific Applications on Hybrid HPC Systems”, in *Workshop on Tools and Compilers for Hardware Acceleration (TCHA'06)*, Seattle, WA, September 2006.
- D. Chassin, P. Armstrong, D. Chavarría-Miranda and R. Guttromson. “Gauss-Seidel Accelerated: Implementing Flow Solvers on Field Programmable Gate Arrays”, in *Proceedings of the IEEE Power Engineering Society General Meeting*, Montreal, Canada, June 2006.
- J. Nieplocha, A. Márquez, V. Tipparaju, D. Chavarría-Miranda, R. Guttromson and H. Huang. “Towards Efficient Parallel State Estimation Solvers on Shared Memory Computers”, in *Proceedings of the IEEE Power Engineering Society General Meeting*, Montreal, Canada, June 2006.
- D. Chavarría-Miranda, J. Nieplocha and V. Tipparaju. “Topology-aware Tile Mapping for Clusters of SMPs”, in *Proceedings of the ACM International Conference on Computing Frontiers (CF'06)*, Ischia, Italy, May 2006.
- D. Chavarría-Miranda and J. Mellor-Crummey. “Effective Communication Coalescing for Data-Parallel Applications”, in *Proceedings of the ACM Symposium on Principles and Practice of Parallel Programming (PPoPP'05)*, Chicago, IL, June 2005.
- C. Coarfa, Y. Dotsenko, J. Mellor-Crummey, F. Cantonnet, T. El-Ghazawi, A. Mohanty, Y. Yao and D. Chavarría-Miranda. “An Evaluation of Global Address Space Programming Languages: CoArray Fortran and Unified Parallel C”, in *Proceedings of the ACM Symposium on Principles and Practice of Parallel Programming (PPoPP'05)*, Chicago, IL, June 2005.
- D. Chavarría-Miranda, G. Jin and J. Mellor-Crummey. “COTS Clusters vs. the Earth Simulator: An Application Study using IMPACT-3D”, *Proceedings of IPDPS'05: International Parallel and Distributed Processing Symposium*, Denver, CO, April 2005.
- Y. Dotsenko, C. Coarfa, J. Mellor-Crummey and D. Chavarría-Miranda. “Experiences with Co-Array Fortran on Hardware Shared Memory Platforms”, in *Proceedings of the International Workshop on Languages and Compiler for Parallel Computing (LCPC 2004)*, West Lafayette, IN, September 2004.
- A. Darte, J. Mellor-Crummey, R. Fowler and D. Chavarría-Miranda. “Generalized multipartitioning of multi-dimensional arrays for parallelizing line-sweep computations”, in *Journal of Parallel and*

Distributed Computing , vol. 63, issue 9, September 2003. Special issue with the Best Papers from the 2002 International Parallel and Distributed Processing Symposium (IPDPS'02).

D. Chavarría-Miranda and J. Mellor-Crummey. “An Evaluation of Data-Parallel Compiler Support for Line-Sweep Applications”, in *Journal of Instruction Level Parallelism*, vol. 5, February 2003. Special issue with selected papers from The Eleventh International Conference on Parallel Architectures and Compilation Techniques (PACT'02).

D. Chavarría-Miranda and J. Mellor-Crummey. “An Evaluation of Data-Parallel Compiler Support for Line-Sweep Applications”, in *Proceedings of the International Conference on Parallel Architectures and Compilation Techniques (PACT'02)*, Charlottesville, VA, September 2002. (Selected as Best Student Paper).

J. Mellor-Crummey, V. Adve, B. Broom, D. Chavarría-Miranda, R. Fowler, G. Jin, K. Kennedy and Q. Yi. “Advanced Optimization Strategies in the Rice dHPF Compiler”, in *Concurrency and Computation: Practice and Experience*, special issue on High-Performance Fortran (HPF), vol. 14, issues 8-9, July-August 2002.

A. Darte, D. Chavarría-Miranda, R. Fowler and J. Mellor-Crummey. “Generalized Multipartitioning for Multi-Dimensional Arrays”, in *Proceedings of IPDPS'02: International Parallel and Distributed Processing Symposium*, Fort Lauderdale, FL, April 2002. (Selected as Best Paper in Algorithms).

D. Chavarría-Miranda, J. Mellor-Crummey and T. Tsarang. “Data-Parallel Compiler Support for Multipartitioning”, in proc. of *Euro-Par 2001: European Conference on Parallel Computing*, Manchester, England, August 2001.

S. Vajracharya and D. Chavarría-Miranda. “Asynchronous Resource Management”, in proc. of *IPDPS'01: International Parallel and Distributed Processing Symposium*, San Francisco, CA, April 2001.

D. Chavarría-Miranda and J. Mellor-Crummey. “Towards Compiler Support for Scalable Parallelism using Multipartitioning”, in proc. of *LCR2000: Fifth Workshop on Languages, Compilers and Run-time Systems for Scalable Computers*, Rochester, NY, May 2000.