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References

[1] J. Fang, A.L. Varbanescu and H.J. Sips (2011). A Comprehensive Performance Comparison of CUDA and OpenCL. In The 40-th International Conference on Parallel Processing (ICPP'11), Taipei, Taiwan.

[2] J. Shen, J. Fang, H. J. Sips, and A. L. Varbanescu. An application-centric evaluation of OpenCL on multi-core CPUs. Parallel Computing, vol. 39, no. 12, pp. 834 – 850, 2013.

[3] J. Shen, A. L. Varbanescu, H. J. Sips, M. Arntzen, D. G. Simons: Glinda: A Framework for Accelerating Imbalanced Applications on Heterogeneous Platforms. In Conf. Computing Frontiers 2013.

[4] J. Shen, H. J. Sips, P. Zou, Y. Lu, A. L. Varbanescu. Matching Imbalanced Workloads with Heterogeneous Platforms. ICS 2014.

[5] Jie Shen and Ana Lucia Varbanescu and Henk Sips. Look Before You Leap: Using the Right Hardware Resources to Accelerate Applications. IEEE HPCC 2014.

[6] Jie Shen and Ana Lucia Varbanescu and Xavier Martorell and Henk Sips (2015). A Study of Application Kernel Structure for Data Parallel Applications. Technical Report PDS-2015-001, Delft University of Technology.

[7] Jie Shen and Ana Lucia Varbanescu and Xavier Martorell and Henk Sips (2015). Matchmaking Applications and Partitioning Strategies for Efficient Execution on Heterogeneous Platforms. ICPP 2015.

[8] Jie Shen and Ana Lucia Varbanescu and Henk Sips (2015). Improving Application Performance by Efficiently Utilizing Heterogeneous Many-core Platforms. CCGrid 2015.

[9] Jie Shen and Ana Lucia Varbanescu and Yutong Lu and Peng Zou and Henk Sips (2016). Workload Partitioning for Accelerating Applications on Heterogeneous Platforms. IEEE Transactions on Parallel and Distributed Systems. [Bibtex]

[10] Yong Guo, Ana Lucia Varbanescu, Dick Epema and Alexandru Iosup (2016). Design and Experimental Evaluation of Distributed Heterogeneous Graph-Processing Systems. CCGrid'16

Other relevant references

[11] Khronos Group., "The OpenCL Specification Version: 1.2 Document Revision 15." http://www.khronos.org/registry/cl/specs/opencl-1.2.pdf, November 2011.

[12] Intel Inc., Writing Optimal OpenCL Code with Intel OpenCL SDK.

[13] J. van der Sande, "Evaluating the Performance and Portability of OpenCL", MSc Thesis, TU Eindhoven, August 2011.

[14] K. Karimi, N. Dickson, and F. Hamze, "A performance comparison of CUDA and OpenCL," Arxiv preprint arXiv:1005.2581, 2010.

[15] R. Membarth, F. Hannig, J. Teich, M. K¨orner, and W. Eckert, "Framework for multi-core architectures: a comprehensive evaluation using 2D/3D image registration," Architecture of Computing Systems-ARCS 2011, pp. 62–73, 2011.

[16] C. K. Akhtar Ali, Usman Dastgeer, "OpenCL for programming shared memory multicore CPUs," in Proceedings of the 5th Workshop on MULTIPROG, in conjunction with HiPEAC 2012, January 2012.

[17] R. Ferrer, J. Planas, P. Bellens, A. Duran, M. Gonzalez, X. Martorell, R. Badia, E. Ayguade, and J. Labarta, "Optimizing the exploitation of multicore processors and GPUs with OpenMP and OpenCL," Languages and Compilers for Parallel Computing, pp. 215–229, 2011.

[18] O. Fagerlund, "Multi-core programming with OpenCL: performance and portability in a memory bound scenario," June 2010. Available at http://daim.idi.ntnu.no.

[19] J. Stone, D. Gohara, and G. Shi, "OpenCL: A parallel programming standard for heterogeneous computing systems," Computing in science & engineering, vol. 12, no. 3, p. 66, 2010.

[20] A. Duran, E. Ayguad´e, R. M. Badia, J. Labarta, L. Martinell, X. Martorell and J. Planas, "Ompss: a Proposal for Programming Heterogeneous Multi-Core Architectures," Parallel Processing Letters, vol. 21, no. 2, pp. 173–193, 2011.

[21] Kazuhiko Komatsu, Katsuto Sato, Yusuke Arai, Kentaro Koyama, Hiroyuki Takizawa, Hiroaki Kobayashi, Evaluating the Performance and Portability of OpenCL Programs, 5th Fifth International Workshop on Automatic Performance Tuning, 2010.

[22] Yao Zhang, Mark Sinclair II, Andrew A. Chien, Improving Performance Portability in OpenCL Programs, Supercomputing, Lecture Notes in Computer Science Volume 7905, 2013, pp 136-150.

[23] V. T. Ravi, W. Ma, D. Chiu, and G. Agrawal. Compiler and Runtime Support for Enabling Generalized Reduction Computations on Heterogeneous Parallel Configurations. In ICS 2010, pages 137–146, 2010.

[24] F. Song and S. Tomov and J. Dongarra. Enabling and Scaling Matrix Computations on Heterogeneous Multi-core and Multi-GPU systems. In ICS 2012, pages 365–376, 2012

[25] M. D. Linderman, J. D. Collins, H. Wang, and T. H. Y. Meng. Merge: A Programming Model for Heterogeneous Multi-core Systems. In ASPLOS 2008, pages 287–296, 2008.

[26] S. Tomov, J. Dongarra, and M. Baboulin. Towards Dense Linear Algebra for Hybrid GPU Accelerated Manycore Systems. Parallel Computing, 36(5-6):232–240, 2010.

[27] D. Grewe and M. F. P. O'Boyle. A Static Task Partitioning Approach for Heterogeneous Systems Using OpenCL. In CC 2011, pages 286–305.

[28] K. Kofler, I. Grasso, B. Cosenza, and T. Fahringer. An Automatic Input-Sensitive Approach for Heterogeneous Task Partitioning. In ICS 2013, pages 149–160, 2013.

[29] C.-K. Luk, S. Hong, and H. Kim. Qilin: Exploiting Parallelism on Heterogeneous Multiprocessors with Adaptive Mapping. In MICRO 2009, pages 45–55, 2009.

[30] A. Snavely, L. Carrington, N. Wolter, J. Labarta, R.M. Badia, A. Purkayastha: A framework for performance modeling and prediction. In SC 2002.

[31] S. Hong and H. Kim. An Integrated GPU Power and Performance Model. In ISCA 2010,

pages 280–289, 2010.

[32] Abdullah Gharaibeh, Lauro Beltrão Costa, Elizeu Santos-Neto, and Matei Ripeanu. 2012. A yoke of oxen and a thousand chickens for heavy lifting graph processing. In Proceedings of the 21st international conference on Parallel architectures and compilation techniques (PACT '12).

[33] Abdullah Gharaibeh, Lauro Beltrao Costa, Elizeu Santos-Neto, and Matei Ripeanu. 2013. On Graphs, GPUs, and Blind Dating: A Workload to Processor Matchmaking Quest. In Proceedings of the 2013 IEEE 27th International Symposium on Parallel and Distributed Processing (IPDPS '13)

[34] Thomas Scogland, Barry Rountree, Wu-chun Feng, Bronis R. de Supinski: Heterogeneous Task Scheduling for Accelerated OpenMP. IPDPS 2012

[35] Sylvain Henry, Alexandre Denis, Denis Barthou, Marie-Christine Counilh, and Raymond Namyst. Toward OpenCL Automatic Multi-Device Support. In Fernando Silva, Ines Dutra, and Vitor Santos Costa, editors, Euro-Par 2014, Porto, Portugal, August 2014. Springer.

[36] Cédric Augonnet, Samuel Thibault, Raymond Namyst, and Pierre-André Wacrenier. StarPU: A Unified Platform for Task Scheduling on Heterogeneous Multicore Architectures. Concurrency and Computation: Practice and Experience, Special Issue: Euro-Par 2009, 23 :187–198, February 2011.