Xiaodong Yu, Ph.D. Candidate

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Research Interests

Parallel Computing; Reconfigurable Computing; Architecture-aware Algorithm Design; System Security; Software Security; Mobile Security; Program Analysis; Deep Learning

Education

2013 – 2019 (expect) **Ph.D. Computer Science, Virginia Tech, Blacksburg VA, USA**
Tentative dissertation title: *Challenges, Algorithms, and Frameworks for Accelerating Security Applications on High-Performance Computing Platforms*
Thesis committee: Prof. Danfeng (Daphne) Yao (Chair), Prof. Michela Becchi (NCSU), Prof. Ali Butt, Prof. Matthew Hicks, Prof. Xinming (Simon) Ou (USF)

2010 – 2013 **M.S. Electrical and Computer Engineering, University of Missouri, Columbia MO, USA**
Advisor: Prof. Michela Becchi
Thesis Title: *Deep Packet Inspection on Large Datasets: Algorithmic and Parallelization Techniques for Accelerating Regular Expression Matching on Many-Core Processors*.

2004 – 2008 **B.S. Mathematics and Applied Mathematics, China University of Mining and Technology (CUMT), China**

Academic & Internship Experience

2017 – current **Graduate Research Assistant.** YAO GROUP@Virginia Tech
Advisor: Prof. Danfeng (Daphne) Yao
Elizabeth and James E. Turner Jr. '56 Faculty Fellow & L-3 Faculty Fellow
Projects: GPU-assisted Android Program Analysis; Cache Side-Channel Attack

Summer 2017 **Intern.** Radeon Technology Group (RTG)@AMD
Mentor: Daniel Lowell
Project: GPU Deep learning library (MIOpen) development

2013 – 2017 **Graduate Research Assistant.** SYNERGY LAB@Virginia Tech
Advisor: Prof. Wu-chun Feng
Projects: GPU-based CT Image Processing; High-performance Automata Processing

2011 – 2013 **Graduate Research Assistant.** NPS LAB@University of Missouri
Advisor: Prof. Michela Becchi
Projects: GPU-based Automata Processing

Research Publications

Journal Articles

1. **Yu**, **X.**, Wang, H., Feng, W.-c., Gong, H., & Cao, G. (2018). GPU-Based Iterative Medical CT Image Reconstructions. *Journal of Signal Processing Systems (Springer)*. (impact factor = 1.088).
2. **Yu**, **X.**, Lin, B., & Becchi, M. (2014). Revisiting State Blow-Up: Automatically Building Augmented-FA While Preserving Functional Equivalence. *IEEE Journal on Selected Areas in Commu. 32*(10), 1822–1833. (impact factor = 7.172, journal-first paper).

Conference Proceedings

1. Lux, T. C. H., Watson, L. T., Bernard, J., Chang, T. H., Li, B., **Yu**, **X.**, Xu, L., Back, G., Butt, A. R., Cameron, K. W., Hong, Y., & Yao, D. (2018). Nonparametric Distribution Models for Predicting and Managing Computational Performance Variability. In *The Annual IEEE Southeast Conf.* (pp. 1–7). IEEE SoutheastCon'18.

2. Lux, T. C. H., Watson, L. T., Chang, T. H., Bernard, J., Li, B., **Yu**, **X.**, Xu, L., Back, G., Butt, A. R., Cameron, K. W., Yao, D., & Hong, Y. (2018). Novel Meshes for Multivariate Interpolation and Approximation. In *The Annual ACM Southeast Conf.* (13:1–13:7). ACMSE'18.
3. Nourian, M., Wang, X., **Yu**, **X.**, Feng, W.-c., & Becchi, M. (2017). Demystifying Automata Processing: GPUs, FPGAs or Micron's AP? In *the ACM Int'l Conf. on Supercomputing* (1:1–1:11). ICS'17. (AR = 15.8%).
4. **Yu**, **X.**, Hou, K., Wang, H., & Feng, W.-c. (2017). A framework for fast and fair evaluation of automata processing hardware. In *IEEE Int'l Symp. on Workload Characterization*. IISWC'17.
5. **Yu**, **X.**, Hou, K., Wang, H., & Feng, W.-c. (2017). Robotomata: A Framework for Approximate Pattern Matching of Big Data on an Automata Processor. In *IEEE Int'l Conf. on Big Data* (pp. 283–292). IEEE BigData'17. (AR = 17.9%).
6. **Yu**, **X.**, Wang, H., Feng, W.-c., Gong, H., & Cao, G. (2017). An Enhanced Image Reconstruction Tool for Computed Tomography on GPUs. In *the ACM Int'l Conf. on Computing Frontiers* (pp. 97–106). CF'17. (AR = 35.5%).
7. **Yu**, **X.**, Feng, W.-c., Yao, D., & Becchi, M. (2016). O^3FA: A Scalable Finite Automata-based Pattern-Matching Engine for Out-of-Order Deep Packet Inspection. In *the 2016 ACM/IEEE Symp. on Arch. for Networking and Commu. Systems* (pp. 1–11). ANCS'16. (AR = 20.7%).
8. **Yu**, **X.**, Wang, H., Feng, W.-c., Gong, H., & Cao, G. (2016). cuART: Fine-Grained Algebraic Reconstruction Technique for Computed Tomography Images on GPUs. In *16th IEEE/ACM Int'l Symp. on Cluster, Cloud and Grid Computing*. CCGrid'16. (AR = 25%).
9. **Yu**, **X.** & Becchi, M. (2013). Exploring Different Automata Representations for Efficient Regular Expression Matching on GPUs. In *ACM SIGPLAN Not.*
10. **Yu**, **X.** & Becchi, M. (2013). GPU Acceleration of Regular Expression Matching for Large Datasets: Exploring the Implementation Space. In *the ACM Int'l Conf. on Computing Frontiers* (18:1–18:10). CF'13.

Professional Activities

Presentations	ACM PPoPP'13, ACM/IEEE ANCS'16, IEEE/ACM CCGrid'16, IEEE BigData'17, ACM/IEEE SC'18 Doctoral Showcase
Journal Reviews	IEEE TDSC (2018), IEEE Access (2017, 2018), JSS (elsevier) (2015, 2017), IEEE JSAC (2014)
Conference Reviews	IEEE HPCC 2017, IEEE ATC'18, IEEE GLOBECOM'18, IEEE ICCCN'18, PACT, S&P, NDSS, ACSAC, AsiaCCS etc.

Honors&Awards

2018	selected to present @ACM/IEEE SC'18 Doctoral Showcase
	selected as the student volunteer @ACM/IEEE SC'18
2016	**Outstanding Graduate Teaching Assistant Award** CS@VT
	SIGCOMM-Travel Grant for ANCS 2016
2013	**NSF-Travel Grant** for PPoPP 2013
2011	**NSF Student Travel Award** for ANCS 2011
2006 – 2007	**Learning Progress Scholarship** @CUMT China

Skills

Coding	C/C++, CUDA, ROCm, openCL, Hardware-specific Language, VHDL/Verilog, assembly language, SHELL, OpenMP, Pthread, JAVA
Dev. Envir.&Tools	Linux/Win OS, AP SDK, MATLAB, Xilinx SDK, GEM5, Mathematica