Adaptive Systems Laboratory

Ben Abdallah Abder-
azek
Professor

Yuichi Okuyama
Associate Professor

Ye Chan
Visiting Researcher

Refereed academic journal

[benab-203-037-01:2015] Abderazek Ben Abdallah Akram Ben Ahmed. Adaptive Fault-Tolerant Architecture and Routing Algorithm for Reliable Many-Core 3D-NoC Systems. *Journal of Parallel and Distributed Computing*, 93-94(ISSN 0743-7315):30–43, July 20016.

> Keywords: 3D NoC; Fault-tolerance; Robustness; Architecture; Dynamic reconfiguration; Deadlock-free

[benab-203-037-02:2015] Abderazek Ben Abdallah Achraf Ben Ahmed. An Energy-efficient High-throughput Mesh-based Phototonic On-chip Interconnect for Many-core Systems. *Photonics*, 3(2), 3 2016.

> Future high-performance embedded and general purpose processors and systems-on-chip are expected to combine hundreds of cores integrated together to satisfy the power and performance requirements of large complex applications. As the number of cores continues to increase, the employment of low-power and high-throughput on-chip interconnect fabrics becomes imperative. In this work, we present a novel mesh-based photonic on-chip interconnect, named PHENIC-II, for future high-performance many-core systems. The novel architecture is based on an energy-efficient non-blocking photonic switch and a contention-aware routing algorithm. Simulation results show that the proposed system provides better bandwidth and energy efficiency when compared to conventional hybrid photonic NoC systems.

[benab-203-037-03:2015] Abderazek Ben Abdallah Achraf Ben Ahmed. Hybrid Silicon-Photonic Network-on-Chip for Future Generations of High-performance Many-core Systems. *Journal of Supercomputing*, 71(12):4446–4475, 12 2015.

> .

Refereed proceedings of an academic conference

[benab-203-037-04:2015] Yuichi Okuyama Abderazek Ben Abdallah Xuan-Tu Tran Khanh N. Dang, Michael Meyer. A Soft-Error Resilient 3D Network-on-Chip Router. In *IEEE 7th International Conference on Awareness Science and Technology (iCAST 2015)*, pages 84 – 90. IEEE, 2015.

> .

[benab-203-037-05:2015] Yuki Tanaka Abderazek Ben Abdallah Michael Meyer, Akram Ben Ahmed. On the Design of a Fault-tolerant Photonic Network-on-Chip. In *IEEE International Conference on Systems, Man, and Cybernetics (SMC2015), Oct. 9-12, 2015*, pages 821 – 826. IEEE, 2015.

.

[benab-203-037-06:2015] Yuki Tanaka Abderazek Ben Abdallah Michael Meyer, Akram Ben Ahmed. On the Design of a Fault-tolerant Photonic Network-on-Chip. In *IEEE International Conference on Systems, Man, and Cybernetics (SMC2015), Oct. 9-12, 2015*, pages 821 – 826. IEEE, 2015.

.

[benab-203-037-07:2015] Yuichi Okuyama Abderazek Ben Abdallah Michael Meyer, Akram Ben Ahmed. FTTDOR: Microring Fault-resilient Optical Router for Reliable Network-on-Chip Systems. In *IEEE 9th International Symposium on Embedded Multicore/Many-core SoCs (MCSoC-15)*, pages 227 – 234. IEEE, 2015.

.

[benab-203-037-08:2015] Yuichi Okuyama Abderazek Ben Abdallah Achraf Ben Ahmed, Michael Meyer. Hybrid Photonic NoC based on Non-blocking Photonic Switch and Light-weight Electronic Router. In *IEEE International Conference on Systems, Man, and Cybernetics (SMC2015)*, pages 56 – 61. IEEE, 2015.

.

[benab-203-037-09:2015] Abderazek Ben Abdallah Achraf Ben Ahmed, Yuichi Okuyama. Contention-free Routing for Hybrid Photonic Mesh-based Network-on-Chip Systems. In *IEEE 9th International Symposium on Embedded Multicore/Many-core SoCs (MCSoC-15)*, pages 235 – 242. IEEE, 2015.

.

[benab-203-037-10:2015] Akram Ben Ahmed Michael Meyer Yuichi Okuyama Abderazek Ben Abdallah, Mitsuhiro Nakamura. Fault-tolerant Router for

Highly-reliable Many-core 3D-NoC Systems. In *3rd International Scientific Conference on Engineering and Applied Sciences (ISCEAS 2015), July 29-31, 2015, Okinawa, Japan.* ISCEAS 2015, 2015.

.

[benab-203-037-11:2015] Yuichi; Ben Abdallah Abderazek Ben Ahmed, Achraf; Okuyama. Non-blocking electro-optic network-on-chip router for high-throughput and low-power many-core systems. In *2015 World Congress on Information Technology and Computer Applications Congress (WCITCA)*, pages 1–7. IEEE, 2015.

.

[benab-203-037-12:2015] Yuichi Okuyama Abderazek Ben Abdallah Achraf Ben Ahmed, Michael Meyer. Efficient Router Architecture, Design and Performance Exploration for Many-core Hybrid Photonic Network-on-Chip (2D-PHENIC). In *International Conference on Information Science and Control Engineering, April 24-26, 2015.*, pages 202 – 206. IEEE, 2015.

.

Writing a textbook or technical book

[benab-203-037-13:2015] Abderazek Ben Abdallah. *Multicore Systems-on-Chip: Architecture, Programming and Design.* Springer-Japan, 2017.

I wrote about 1/3 of this book in 2015. The whole book will be complted and published in 2017.

Research grants from scientific research funds and public organizations

[benab-203-037-14:2015] Abderazek Ben Abdallah. Photonic 3D-Network-on-Chip for High-throughput Many-core Systems, 2015.

[benab-203-037-15:2015] Abderaezk Ben Abdallah (Co-investigator). 3D Printing in Creative Factory Contexts for English Language Learning, 2015.

[benab-203-037-16:2015] Abderaezk Ben Abdallah (Co-investigator). 3D Printing in Creative Factory Contexts for English Language Learning, 2015.

Academic society activities

[benab-203-037-17:2015] Abderazek Ben Abdallah, 2015.

> I am the organizer and the steering Chair of the IEEE MCSoC-16 Symposium: http://www.mcsoc-forum.org/

[benab-203-037-18:2015] Abderazek Ben Abdallah, 2016.

> PC member of the COOLChips XIX 2016 Symposium, Yokohama, Japan. http://www.coolchips.org/2016/

Patent

[benab-203-037-19:2015] Abderazek Ben Abdallah. Methods, Algorithm, and Robust Fault-tolerant Router for Reliable Networks-on-Chip, 29016.

[benab-203-037-20:2015] Abderazek Ben Abdallah. A Photonic Network-on-Chip System employing non-blocking photonic switches with respective control units, and a method of setting up the Photonic Network-on-Chip, 2015.

Advisor for undergraduate research and graduate research

[benab-203-037-21:2015] Achraf Ben Ahmed. Ph.d. thesis, Gradute School of Computer Science and Engineering, The University of Aizu, 3 2016.

[benab-203-037-22:2015] Akihito Kajikawa. B.s. thesis, School of Computer Science and Engineering, The University of Aizu, 3 2016.

[benab-203-037-23:2015] Ken Saito. B.s. thesis, School of Computer Science and Engineering, The University of Aizu, 2016.

Other significant contribution toward university planning, management, or administration

Summary of Achievement

[benab-203-037-24:2015] - Head of the CE Division Member of the following commitees/coucils: - Member of the Center for Language Research Faculty Search Committee, University of Aizu, 2015 - Chairperson of the Qualification Examination Committee for acquisition of Tenure for Division of computer Engineering, University of Aizu, 2014,2015 - Chairperson of the Computer Engineering Division Faculty Search Committee, University of Aizu, 2014- o - Member of the Education and Research Council, University of Aizu, Japan, 2014, 2015 o Member of the - Member o fthe Evaluation Committee for the Project, University of Aizu, Japan, 2014, 2015 - Member of Invention Deliberation Invention Council, University of Aizu, Japan, 2014, 2015 o Member of Faculty Search Executive Council, University of Aizu, Japan, 2014, 2015

Did you participate in Public Lectures, and/or Open Campus? (Yes or No) If yes, please describe what you did.

[benab-203-037-25:2015] Organized and participatd in Open-Lab/Open-Campus activities