FROM THE EDITOR-IN-CHIEF

Emerging System Interconnects Enabling More Opportunities Than Ever!

Lizy Kurian John, *The University of Texas at Austin, Austin, TX, 78712, USA*

Welcome to the March/April 2023 issue of *IEEE Micro*! This special issue brings to *IEEE Micro* readership an assortment of fantastic articles from two "interconnect" venues—the Special Issue on Emerging System Interconnects and the Special Issue based on the Hot Interconnects 29 Conference.

The Special Issue on Emerging System Interconnects comprises nine papers focusing on emerging technologies such as Compute Express Link (CXL) and Universal Chiplet Interconnect Express (UCIe). Out of the nine articles, six are from industry. The special issue starts with articles on use cases of CXL technology such as scaleout rack architectures, memory tiering, and memory pooling. Memory pools for clouds, prototypes for dynamic allocation in memory pools, and software runtime to manage memory pools are presented in three subsequent articles. Emerging opportunities enabled by CXL are discussed in the following articles on CXL-enabled memory functions and disaggregated persistent memory systems that provide fault tolerance for recommendation model training, removing the overhead of checkpointing from a critical path. An article on UCIe interconnect for chiplet integration is presented next followed by an article on photonic network-on-wafer interconnect. The special issue guest editors, John Kim of the Korea Advanced Institute of Science and Technology and Nam Sung Kim of the University of Illinois (Urbana), have written an introduction to the emerging system interconnects theme, which presents a preview of the nine articles from this special issue.

The current issue also presents a collection of articles from the 2022 Hot Interconnect Conference (Hot Interconnects 29). Hot Interconnects is a conference that brings to light the state of the art in interconnect technology. In the modern systems on chip and large-scale computer systems, many processing components are being interconnected, and the larger system's performance and energy consumption significantly depend on the interconnect. Four selected articles from Hot Interconnects 29 are presented in this issue. The presented articles are on CXL, followed by an article on a novel packet classification architecture, a monitoring tool for congestion in InfiniBand networks, and on noncontiguous data transfer, utilizing gather–scatter functionality of InfiniBand. The special issue guest editor, Scott Levy of Sandia National Laboratories, has written an introduction to the Hot Interconnects 29 theme, which provides a preview of the four articles.

READERS OF IEEE MICRO *WILL CONTINUE TO GET ARTICLES ON EMERGING CHIP TECHNOLOGIES AND ARCHITECTURES AS WE GO FURTHER INTO 2023.*

I would like to express my special gratitude to the special issue editors John Kim and Nam Sung Kim for publicizing the Special Issue on Emerging System Interconnects, obtaining an excellent set of submissions, and assembling a collection of fantastic articles for this theme. I also thank the guest editor Scott Levy who worked hard on identifying the top papers from Hot Interconnects 29, and taking them through a rigorous review/revision process, which resulted in the excellent set of articles that you are presented with.

The 13 articles from the Emerging System Interconnects and Hot Interconnects themes are accompanied by a Micro Economics column by Shane Greenstein. In the Micro Economics article, "Butterfly effects and legacies," Greenstein presents an interesting perspective related to the 75th anniversary of the transistor, which just passed by in December 2022. He describes a series of butterfly effects from the invention of the transistor, likening it to how a butterfly's wing flapping in one location causes a ripple in the wind leading to a tornado elsewhere. He discusses the wing flap (the invention of the

0272-1732 © 2023 IEEE
Digital Object Identifier 10.1109/MM.2023.3244677
Date of current version 13 March 2023.

transistor) and the many tornados (including the creation of Fairchild instruments) that followed.

Readers of *IEEE Micro* will continue to get articles on emerging chip technologies and architectures as we go further into 2023. This issue will be followed by the Special Issue on Hot Chips in May/June. The subsequent issues will be Top Picks from architecture conferences, the Special Issue on Privacy Preserving Execution Environments, and the Special Issue on TinyML. You can check the upcoming Call for Papers at https://www.computer.org/digital-library/magazine/mi/cfp-tiny-ml.

In addition to the special issue articles, *IEEE Micro* is always interested in submissions on any aspect of chip/system design or architecture. Please consider submitting articles to *IEEE Micro* and remember, these articles are eligible for the best paper award, which is given annually.

EMERGING SYSTEM INTERCONNECTS AND ADVANCES IN INTERCONNECTS ARE HELPING THE WORLD TO BE MORE NETWORKED AND PRODUCTIVE! ENJOY THESE ARTICLES!

Emerging system interconnects and advances in interconnects are helping the world to be more networked and productive! Enjoy these articles!

LIZY KURIAN JOHN is a Truchard Foundation Chair and professor in the Electrical and Computer Engineering Department, University of Texas at Austin, Austin, TX, 78712, USA. She is a Fellow of IEEE, ACM, and the National Academy of Inventors (NAI). Contact her at ljohn@ece.utexas.edu.

***IEEE Security & Privacy* magazine provides articles with both a practical and research bent by the top thinkers in the field.**

- stay current on the latest security tools and theories and gain invaluable practical and research knowledge,
- learn more about the latest techniques and cutting-edge technology, and
- discover case studies, tutorials, columns, and in-depth interviews and podcasts for the information security industry.

computer.org/security

IEEE COMPUTER SOCIETY IEEE