

Top Picks from 2021 Computer Architecture Conferences!

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



IEEE Micro is presenting to you the very familiar *IEEE Micro* Top Picks issue. For more than a decade, *IEEE Micro* has had this tradition of evaluating papers from the previous year's architecture conferences and selecting the papers with the most novelty and potential for long-term impact. *IEEE Micro* is upholding the tradition this year as well. Any article published in top architecture conferences during 2021 was eligible to compete for the Top Picks honor. In total, 109 submissions were received, from which 12 articles were chosen to represent the cream of the crop of 2021.

Drs. Sudhanva Gurumurthi of AMD and Radu Teoderescu of Ohio State University chaired this year's selection committee. The selection committee chairs and 43 experts from academia and industry from around the world worked hard to identify 12 Top Picks and 12 honorable mention articles. An article recognized as a Top Pick was invited to prepare an article for inclusion in this special issue. The articles in this special issue are intended to be for a broader audience than the original conference articles. These articles also focus more on their potential impact. The honorable mentions are high-quality articles that unfortunately could not be included in the special issue due to space constraints. They are listed in the guest editors' introduction. Interested readers can locate them in the original conference proceedings or the IEEE/ACM Digital Library.

The purpose of the Top Picks issue has been multi-fold. First and foremost, Top Picks was originally instituted to present the "best of the best" of the preceding year's architecture research contributions to a broader audience including industry and other fields, increasing the potential impact of the articles. The second goal of Top Picks is to recognize excellent research in the field and bestow this honor on researchers who conducted the outstanding research

that resulted in these articles. It is critically important for our field to honor our budding researchers and help them to shape their careers. The Top Picks honor has been seen to be instrumental in achieving faculty positions, leading research positions in industry, and prestigious research grants. Third, the writing style intended for a broader audience makes it easy for beginner graduate students to understand the state of the art of the field as they are pondering on topics to work for their Ph. Ds. Above all, I expect these articles to be enjoyable reads for all the readers of *IEEE Micro*.

THE TOP PICKS HONOR HAS BEEN SEEN TO BE INSTRUMENTAL IN ACHIEVING FACULTY POSITIONS, LEADING RESEARCH POSITIONS IN INDUSTRY, AND PRESTIGIOUS RESEARCH GRANTS.

I take this opportunity to express my gratitude to Gurumurthi and Teoderescu and the selection committee members, who spent countless hours during the Christmas and New Year season evaluating the submissions, conducted a virtual meeting, and deliberated a whole day to perform this important selection. The committee conducted a multiround selection process, which is described in the guest editor introduction. I wish to express my special thanks to Chairs Gurumurthi and Teoderescu and the selection committee for the thoughtful process and hard work.

The Top Picks articles belong to the following four themes:

- 1) data center and cloud;
- 2) security and reliability;
- 3) emerging applications and architectures;
- 4) memory models and optimization.

One may recognize that these are highly relevant topics in this age and time. A comprehensive article

written by the guest editors serves as an excellent introduction to the compendium.

I want to personally congratulate all the Top Picks authors for their fantastic work. It is a significant honor to rise to the top in a competition where each candidate's paper is already recognized as an excellent piece of work. I hope that these works have a significant impact on future computer systems.

In addition to the Top Picks articles, this issue also features a Micro Law column from Joshua Yi, titled "Analysis of Historical Patenting Behavior and Patent Characteristics of Computer Architecture Companies—Part III: Claims." This is a continuation of Yi's articles from the March/April 2022 and May/June 2022 issues of IEEE Micro. Part I of this series (in March/April 2022) analyzed the number and type of patents that were issued to 18 leading computer architecture companies for patents that were filed between 1996 and 2020. Part II (in May/June 2022) analyzed the prosecution time and effective patent term length for those patents. This article builds on that work by analyzing the number and type of claims. Due to the large amount of claims-related data, Parts III and IV will focus on the claims. Part III is presented in this issue and Part IV will be published in the September/October 2022 issue of IEEE Micro.

Additionally, this issue features a Micro Economics column by Shane Greenstein of Harvard Business School, titled "Inflation and Technology Markets." This article discusses the increase in Consumer Price Index between May 2021 and April 2022. Although the Consumer Price Index increased by 8% and inflation is the highest in four decades, his analysis suggests that most firms in technology cannot raise prices much, if at all. He points out that prices declined in smartphones (16.3%), and also software and accessories for consumers (4.3%). His article presents many interesting trends related to inflation and its impact on technology markets.

Computer architecture conferences are going in-person after two years of virtual conferences. There is no doubt that increased research is needed to design hardware and software that efficiently meets the demands of the emerging era. Hopefully, the interactions at the conferences will help in increasing the exchange of ideas and improving research.

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I hope this special issue is thought-provoking for our readers and helps shape the field for many years to come. I also hope that researchers in the field intensify their efforts to design better chips and systems to help medical research as well as our ordinary daily lives. In addition, I encourage readers to submit to *IEEE Micro*. *IEEE Micro* is interested in submissions on any aspect of chip/system design or architecture.

May the Top Picks articles bring some happy reading to you!

LIZY KURIAN JOHN is a Cullen Trust for Higher Education Endowed Professor in the Electrical and Computer Engineering Department, University of Texas at Austin. Austin, TX, USA. She is a Fellow of IEEE, ACM, and the National Academy of Inventors. Contact her at ljohn@ece.utexas.edu.