

Bridging the Moore's Law Performance Gap with Innovation Scaling

[Keynote Talk]

Todd Austin
University of Michigan
2260 Hayward Avenue
Ann Arbor (USA)
austin@umich.edu

ABSTRACT

The end of Dennard scaling and the tyranny of Ahmdal's law have created significant barriers to system scaling, leading to a gap between today's system performance and where Moore's law predicted it should be.

I believe the solution to this problem is to scale innovation. Finding better solutions to improve system performance and efficiency, and doing this more quickly than previously possible could address the growing performance gap.

In this talk, I will highlight a number of simple (and not so simple) ideas to address this challenge.

Categories and Subject Descriptors

B.8 [Performance and Reliability]: Miscellaneous; C.1 [Processor Architectures]: General; C.4 [Performance of Systems]: Performance attributes

General Terms

Computer Architecture, Performance

Keywords

System Performance, System Efficiency, System Scaling

Short Bio

Todd Austin is a Professor of Electrical Engineering and Computer Science at the University of Michigan in Ann Arbor.

His research interests include computer architecture, robust and secure system design, hardware and software verification, and performance analysis tools and techniques.

Currently Todd is director of C-FAR, the Center for Future Architectures Research, a multi-university SRC/DARPA funded center that is seeking technologies to scale the performance and efficiency of future computing systems.

Prior to joining academia, Todd was a Senior Computer Architect in Intel's Microcomputer Research Labs, a product-oriented research laboratory in Hillsboro, Oregon. Todd is the first to take credit (but the last to accept blame) for creating the SimpleScalar Tool Set, a popular collection of computer architecture performance analysis tools. Todd is co-author (with Andrew Tanenbaum) of the undergraduate computer architecture textbook, "Structured Computer Architecture, 6th Ed".

In addition to his work in academia, Todd is founder and President of SimpleScalar LLC and co-founder of InTempo Design LLC. In 2002, Todd was a Sloan Research Fellow, and in 2007 he received the ACM Maurice Wilkes Award for "innovative contributions in Computer Architecture including the SimpleScalar Toolkit and the DIVA and Razor architectures". Todd received his PhD in Computer Science from the University of Wisconsin in 1996.



Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage, and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s). Copyright is held by the author/owner(s).

ICPE'15, Jan. 31–Feb. 4, 2015, Austin, Texas, USA.

ACM 978-1-4503-3248-4/15/01.

<http://dx.doi.org/10.1145/2668930.2693196> .