

FRENCH IEEE-CAS CHAPTER

Sponsored by the CAS Society under its Distinguished Lecturer Program

29 May 2001

at

I.S.E.P

28 Rue Notre Dame Des Champs

75006 Paris, France

The CAS Distinguished Lecturer Professor Vojin Oklobdzija, will give two lectures:

Lecture 1: Modern Microprocessor Architectures: Evolution of RISC into Super-Scalars

This presentation covers the guiding principles of modern micro-processor architecture. It analyzes the basis of RISC architecture and shows the relation to micro-architecture and pipeline as a basis for high-performance implementation. The next step, super-scalar implementations is explained with respect to performance and difficulties of implementation. The super-scalar pipeline is contrasted to that of vector and VLIW machines.

Lecture 2: Timing Elements and Timing Issues in High Performance Processors

This talk covers issues of timing: clocking, clock distribution and timing elements in high-performance systems. The clocked storage elements are the single most analyzed and debated circuit structures in modern microprocessors. Their importance is in the fact that they provide a boundary between the ever-shrinking pipelined stages. The demand for high-performance mandates detailed understanding of timing issues and the intricate inner working of timing elements. The techniques known as: "time borrowing", "slack passing" or "cycle stealing" are based on the fact that the extra time needed could be traded with the time allowed for the next cycle. Those techniques are increasingly used and they are intimately related to the inner workings of timing elements. This talk will also present a number of clocked storage elements used in modern microprocessors and discuss the timing issues and design guidelines.

Schedule of the Lectures

14h00-15h30 : Lecture 1

15h30-16h00 : Coffee break

16h00-17h00 : Lecture 2

17h00 : CAS Chapter Meeting

Prof. Vojin G. Oklobdzija, obtained Ph.D. in Computer Science from the University of California, Los Angeles in 1982, MSc degree in 1978 and Dipl. Ing. (MScEE) from the Electrical Engineering Department, University of Belgrade, Yugoslavia in 1971. From 1982 to 1991 he was at the IBM T.J.Watson Research Center in New York where he worked on development of RISC architecture and processors and super-scalar RISC, IBM RS/6000 (PowerPC) in particular, on which he co-holds a patent on Register-Renaming. This technique enabled the entire generation of super-scalar processors and is used in every high-performance processor today. From 1988-90 he was visiting faculty at the University of California Berkeley while on leave from IBM. Since 1991 Prof. Oklobdzija has held various consulting and academic positions. He was consultant to Sun Microsystems Laboratories, AT&T Bell Laboratories, Hitachi Research Laboratories, Silicon Systems Inc. and Siemens Corp. where he was principal architect for the new generation of embedded logic and memory processors. Currently he is advisor to SONY and Fujitsu Laboratories. Prof. Oklobdzija has academic appointment with the University of California and various visiting academic appointments. As a Fulbright professor he was lecturing at the universities in South America. In 1991 he spent time in Peru and Bolivia as a Fulbright Professor developing academic programs in South America. During 1996-98 he taught courses in the Silicon Valley through the University of California Berkeley Extension and Hewlett-Packard. Prof. Oklobdzija holds five U.S., five European, one Japan and one Taiwan patents and eight other US patents currently pending. He is a Fellow of IEEE and a member of American Association of the University Professors. He serves on the editorial boards of the Journal of VLSI Signal Processing and IEEE Transaction of VLSI Systems and as a program committee member of the International Solid-State Circuits Conference. He was a General Chair of the 13th Symposium on Computer Arithmetic, Vice Chair at the International Conference on Computer Design, organizer of 2001 Microprocessor Design Workshop and program committee member of the International Symposium on VLSI Technology. He has published over 120 papers and has given over 100 invited talks and short courses in the USA, Europe, Latin America, Australia, China and Japan.