Πανεπιστήμιο Κύπρου
University of Cyprus

School of Engineering
Department of Electrical and Computer Engineering

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# Department of Electrical and Computer Engineering

**Title:** « DaemonGuard: O/S-Assisted Selective Software-Based Self-Testing for Multi-Core Systems »

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**Room ΠΤΕΡ Ε113, Old Campus**
**University of Cyprus**

**Abstract**:
As technology scales deep into the sub-micron regime, transistors become less reliable. Future systems are widely predicted to suffer from considerable aging and wear-out effects. This ominous threat has urged system designers to develop effective run-time testing methodologies that can monitor and assess the system's health. In this work, we investigate the potential of online software-based functional testing at the granularity of individual microprocessor core components in multi-core systems. While existing techniques monolithically test the entire core, our approach aims to reduce testing time by avoiding the over-testing of under-utilized units. To facilitate fine-grained testing, we introduce Daemon Guard, a framework that enables the real-time observation of individual sub-core modules and performs on-demand selective testing of only the modules that have recently been stressed. The monitoring and test-initiation process is orchestrated by a transparent, minimally-intrusive, and lightweight operating system process that observes the utilization of individual datapath components at run-time. We perform a series of experiments using a full-system, execution-driven simulation framework running a commodity operating system, real multi-threaded workloads, and test programs. Our results indicate that operating-system-assisted selective testing at the sub-core level leads to substantial savings in testing time and very low impact on system performance.

**Biography:**
Michael Skitsas is currently a PhD Candidate in the Department of Electrical and Computer Engineering at the University of Cyprus and a researcher at the KIOS Research Centre. He received his Engineer Diploma (Dipl.-Ing.) in Electronic and Computer Engineering from Technical University of Crete in 2009. His main research interest areas are Reliability and Testing of Digital Systems, Algorithms and Intractability Theory, Graph Theory, Embedded Systems and Computer Architecture.