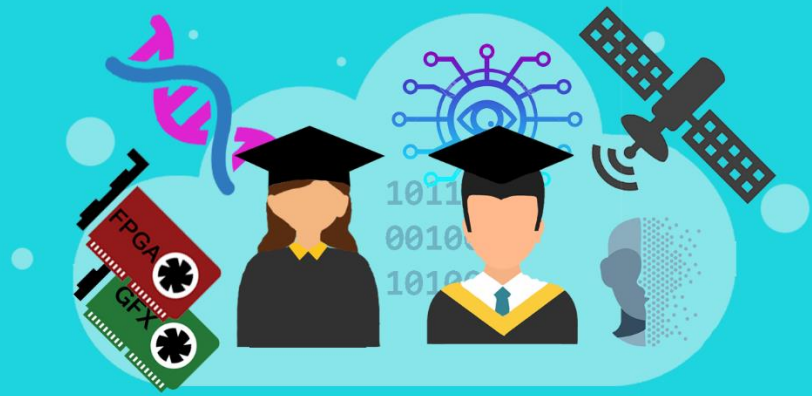


# Diploma Thesis

Microprocessors and  
Digital Systems  
Laboratory

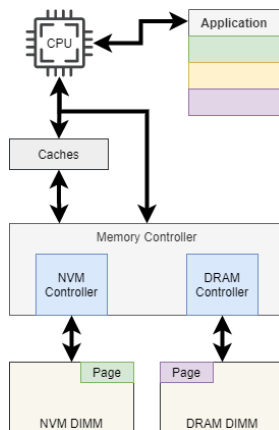
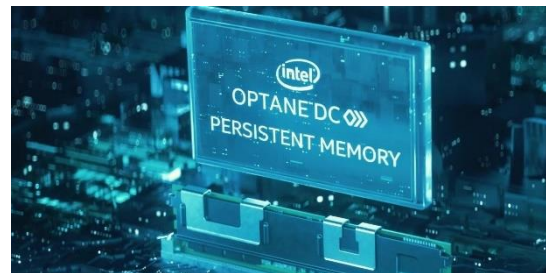
Available 2021



## Exploring the New Memory Era with Intel Optane DC Persistent Memory

Intel Optane DC persistent memory is an innovative non-volatile memory (NVM) technology that delivers a unique combination of affordable large capacity and support for data persistence. Intel Optane DC persistent memory redefines traditional architectures, offering a large and persistent memory tier at an affordable cost. With breakthrough performance levels in memory intensive workloads, virtual machine density, and fast storage capacity Intel Optane persistent memory accelerates IT transformation to support the demands of the data era.

The key thing that differentiates persistent memory DIMMs from DRAM DIMMs is that the data stored on them can be retained when the system is shut down or loses power. This allows the technology to be used as a form of permanent storage like Hard Disk Drives (HDDs) or Solid-State Drives (SSDs), but with DRAM-like latencies. On the same time, Intel Optane provides high density and high scalability with significant power and energy savings.



This new persistent memory is designed to exist alongside volatile memory such as DRAM, composing a novel hybrid memory architecture and introducing a set of challenges, both in academic and industrial community. Cloud infrastructures and High Performance Computing (HPC) systems take advantage of NVM memory technologies and Intel Optane DC aiming to optimize their services and handle the massive amount of data produced, while providing optimized energy consumption.

Towards this direction, our lab aims to investigate several aspects of the existing DRAM-Intel Optane DC architectures, through a number of diploma theses, such as memory allocation and memory management techniques, database systems, NVM-specific data structures, fault-tolerance, consistency and persistence.

**PREREQUISITES:** C/C++ Programming Languages, Bash/Shell/Python Scripting, Linux

### **CONTACT INFORMATION:**

Manolis Katsaragakis Ph.D.: [m.katsaragakis@microlab.ntua.gr](mailto:m.katsaragakis@microlab.ntua.gr)

Dr. Lazaros Papadopoulos : [lpapadop@microlab.ntua.gr](mailto:lpapadop@microlab.ntua.gr)

Prof. Dimitrios Soudris: [dsoudris@microlab.ntua.gr](mailto:dsoudris@microlab.ntua.gr)