



Computing Systems Laboratory
(Institute of Computer and Communication Systems)
National Technical University of Athens
Dept. of Electrical and Computer Engineering
Polytechniopolis Zografou, 15773 Athens, Greece

CSLab - (ICCS-NTUA) Profile

The National Technical University of Athens (NTUA) is the leading and most prestigious Technical University in Greece. The Computing Systems Laboratory (CSLab - www.cslab.ece.ntua.gr) is one of the largest research laboratories in the Computer Science Department of the School of Electrical and Computer Engineering, NTUA. The lab is also a member of the Institute of Communication and Computer Systems (ICCS) of NTUA. It employs experienced staff in administration, training, consulting and development covering aspects of high performance computing and networking, which are most willing to offer their specialised services to the academic research community and to external customers seeking computational power. The lab has large involvement and participation in several national and European research projects.

CSLab possesses a strong expertise in parallel & distributed systems, mainly grid based systems. It has over 10 year experience with clusters and is involved in the design, assembly and operation of large systems for several Grid projects. Moreover, due to its large involvement in research for grid infrastructures and software, CSLab contributes in P2P approaches for grid level data management and P2P algorithms for load balancing and scheduling of distributed applications to run on GRID infrastructure. CSLab operates the largest Grid node in Athens - Democritus Research Centre (64 CPUs/10 TB) for GRNET (the Greek NREN) in EGEE IST Project (Enabling Grids for E-science in Europe), a project that aims to integrate national, regional and thematic Grid efforts, in order to create a seamless European Grid infrastructure for the support of the ERA. CSLab is one of the key initiators of the HellasGrid Task Force, with main target the development of a Grid National Strategy and coordination of local communities, applications activities and management actions. CSLab together with GRNET designed the implementation plan for HellasGrid, which will eventually build a large distributed grid infrastructure comprising of over 800 CPUs and 30TB storage distributed in 6 site installations around Greece.

CSLab's computing infrastructure comprises several high-end computer systems, two quad SMP architectures (Sun HPC 450) and various Linux clusters from off-the-shelf nodes with high performance interconnects. Specifically, in CSLab there are several Linux Clusters with the following configurations: 16 x PIII@500 with SCI, 8 x dual PIII@800, 4 x dual PIII@1266, 12 x Athlon@1600, 8 x dual (EM64T) Xeon@2800. Supported interconnects include: Gigabit Ethernet, Scalable Coherent Interface (1GB/sec - 32 NICs) and Myrinet (2+2GB/sec - 12 NICs). CSLab's storage systems include two SATA RAID-5 Arrays with 1,5TB capacity each. The aforementioned equipment constitutes a test bed platform for research in code optimization for HPC applications (earth & life sciences), communication architectures' middleware for clusters, data & storage management for large scale distributed systems (GRID, P2P) etc.

The laboratory has a strong research background concerning advanced computing architectures. Laboratory members have an academic record of more than 300 research publications in the field in international journals and conferences. CSLab activities span both research and academic/teaching areas, mainly focusing on the following research fields:

- Large Scale Computing & Storage Systems
- Scalable High Speed Interconnects for Cluster Computing
- Interaction between Compilers, Operating Systems and Architectures
- Advanced Microprocessor Architectures
- Embedded (Networking) Systems
- High Level Hardware Design Automation
- High Performance Medical Applications

CSLab (www.cslab.ece.ntua.gr) comprises the Parallel and Distributed Systems Group (pdsq.cslab.ece.ntua.gr) focusing on research in the fields of Cluster Computing with advanced communication architectures. The group elaborates on system software for communication architectures for clusters and on interaction between compilers and computer architectures, mainly code optimization techniques for modern processors. It also investigates advanced OS and application scheduling techniques to avoid memory bottlenecks and exploit novel network interfaces features from the user's perspective. Finally, the group works on data and storage management for large scale systems, i.e. seamless and ubiquitous data provisioning from distributed storage devices over GRID and P2P systems.



The group has published, in the last five years, over 80 papers in various IEEE and ACM conferences (CC-Grid, IPDPS, ICPP, HPCA etc) and international referred journals (IEEE TPDS, JPDC, JSC etc) in the areas of parallel computing. Members of the lab have received the prestigious 2001 best paper award in IEEE/ACM IPDPS Conf, San Francisco, Calif., April 2001. CSLab organized the 18th ACM Symposium on Applied Computing Special Track on Parallel and Distributed Systems and Networking, held in Melbourne, Florida, USA, March 9 - 12, 2003, the 19th ACM Symposium on Applied Computing Special Track on Parallel and Systems, held in Nicosia, Cyprus, March 14-17, 2004 and the 20th ACM Symposium on Applied Computing Special Track on Distributed Systems and Grid Computing, held in Santa Fe, USA, March 2005. Finally, CSLab hosts the IEEE Computer Society Greek Chapter.

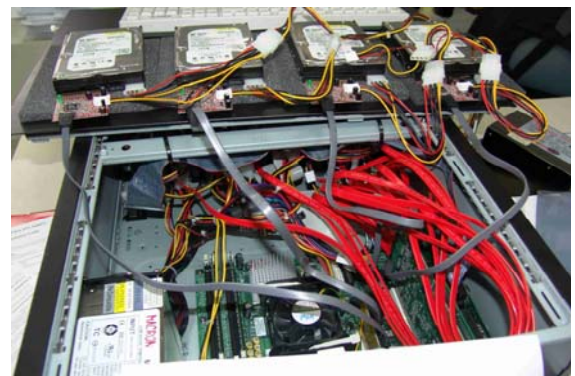
Selected publications can be found in: www.cslab.ece.ntua.gr/publications page, or in www.cslab.ece.ntua.gr/~nkoziris/publications.html

CSLab is largely involved in the academic curricula of NTUA's School of Electrical and Computer Engineering. Many of the mandatory and optional courses and lab sessions of the Computer Science stream of courses are conducted under the supervision of CSLab. Some of the courses offered by the lab members are *Computer Organization, Operating Systems, Advanced Computer Architecture, Parallel Processing Systems and Computing Systems Lab*.

The lab has 3 faculty members, over 15 graduate students pursuing their PhD and 10 undergraduates. Its Alumni comprises more than 30 members, now faculty members in various universities, or research personnel in Greek and European IT industry.

Projects related to HPC domain:

- SMART-PIV: “Development of an Interactive Integrated P.I.V System based on Miniaturised Optical Sensor Technology for Implantable Biomedical Devices Design,” FP5 IST-2002-37548 (started June 2002).
- AMICA: “Assembling Data and Knowledge at the Point of Care To Improve Medical Decision Making And Prevent Errors,” FP6 IST-2004-607048,
- TOPCARE: “Implementation of a telematic homecare platform in cooperative health care provider networks,” FP5 IST-2000-25068.
- EGEE: “Enabling Grids for E-science in Europe”, FP6 Research Infrastructures, INFOSORI 508833, 3-rd Party under GRNET.
- INCO-DC: “PEACE by High Performance Computing,” INCO-950895-EU.
- TetraMED: “Technology Transfer in HPCN in the Mediterranean Countries,” HPCN-III/98/028-EU.
- WEBCLUSTER: “A Cluster Computing System Architecture as a High Performance Web Server - WEBCLUSTER,” PEPER-2003, GSRT.
- VELOS: “Advanced CAD Applications in Aircraft and Vehicle Design using High Performance Computing Architectures,” GSRT-EKBAN.
- PENED-91/663: “Automated Synthesis of VLSI Architectures for Special Purpose Applications”, Greek Secretariat for Research and Technology-GSRT, Ministry of Development.
- PENED-95/1405: “Automatic Parallelization of Sequential Algorithms”, Greek Secretariat for Research and Technology” - GSRT, Ministry of Development.
- AMBULANCE: “Mobile Unit for Health Care Provision via Telematics Support.” (EU/Telematics - Health Care).
- NIKA: “A generalised system for medical image management,” GSRT-EKBAN-504.
- HILDE: “Hypermedia Intelligent Learning Design Environment,” GSRT-EPET-2.
- MODULATES MM-1018: “Multimedia Organisation for Developing the Understanding and Learning of Advanced Technology in European Schools,” EU-Educational Multimedia Taskforce.
- ARTEMIS: “Greek Distributed Digital Library for Grey Literature,” EPEAEK.
- DIALOGOS: “Development of the Greek language and speech industry,” GSRT-EKBAN (parallel computing platform for Greek speech recognition).



Key personnel:

George Papakonstantinou, Professor (Head of the Lab) received his Diploma in Electrical Engineering from the National Technical University of Athens in 1964, the P.I.I. Diploma in Electronic Engineering from Philips Int. Inst in 1966, and his M.Sc. in Electronic Engineering from N.U.F.F.I.C. Netherlands in 1967. In 1971 he received his Ph.D. in Computer Engineering from the National Technical University of Athens. He has worked as a Research Scientist at the Greek Atomic Energy Commission/Computer Division (1969-1984), as Director of the Computer Division at the Greek Atomic Energy Commission (1981-1984). From 1984 he serves as a Professor of Computer Science at the National Technical University of Athens. His research interests include Knowledge Engineering, Syntactic Pattern Recognition, Multimedia Technology as well as Parallel Architectures and Languages. He has published over than 70 papers in international referred journals, over than 175 papers in proceedings of international conferences. He has also published 8 Greek textbooks and contributed 4 chapters to English textbooks on computer engineering. He has taught several undergraduate and graduate courses at NTUA, supervised many diploma and Ph.D. theses, and has been reviewer in International Journals, Conferences, and research project proposals. He has participated (as project leader or member) in about 20 Greek and European R&D projects.

Panayiotis Tsanakas, Professor, received his Diploma in Electrical engineering from the University of Thessaloniki (1982), his M.Sc. in Computer Engineering from Ohio University (1985), and his PhD in Computer Engineering from the National Technical University of Athens (1988). He is now serving as Professor at the School of Electrical and Computing Engineering of the National Technical University of Athens. His research interests include high performance architectures, and distributed applications in medicine and education. He co-authored six textbooks (in Greek): Operating System Principles, Introduction to Computer Architecture, The Operating System EMPIX, Parallel Computing Systems, Mapping Algorithms into Parallel Processing Architectures, Computer Architecture and Operating Systems. He has published more than 15 papers in refereed scientific journals, and more than 40 papers in the proceedings of international conferences and workshops. He has served as reviewer for several International Journals and Conferences, and as evaluator for research project proposals. Prof. Tsanakas is the Chair for the Greek Research and Education Network (GRNET-Greek NREN, www.grnet.gr).

Nectarios Koziris, Assistant Professor, received his Diploma in Electrical Engineering from the National Technical University of Athens (NTUA) and his Ph.D. in Computer Engineering from NTUA (1997). He joined the Computer Science Department, School of Electrical and Computer Engineering at the National Technical University of Athens in 1998, where he currently serves as an Assistant Professor. His research interests include Computer Architecture, Parallel Processing, Parallel Architectures (OS and Compiler Support, Loop Compilation Techniques, Automatic Algorithm Mapping and Partitioning) and Communication Architectures for Clusters. He has published more than 60 research papers in international refereed journals and in the proceedings of international conferences and workshops. He has also published two Greek textbooks "Mapping Algorithms into Parallel Processing Architectures", and "Computer Architecture and Operating Systems". Nectarios Koziris is a recipient of the IEEE IPDPS 2001 best paper award for the paper "Minimising Completion Time for Loop Tiling with Computation and Communication Overlapping" (held at San Francisco, California). He serves as a reviewer in International Journals and various HPC Conferences (IPDPS, ICPP etc). He served as a Program Committee member in HiPC-2002 & ICPP-2005 conferences, CAC03 & CAC04 workshops (organized with IPDPS), and Program Committee co-Chair for the ACM SAC03-PDS, SAC04-PDSN and SAC05-DSGC Tracks. He is a project leader in several EU (FP5 & FP6) and national Research Programmes. He is a member of IEEE Computer Society, member of IEEE-CS TCPP and TCCA (Technical Committees on Parallel Processing and Computer Architecture), ACM and chairs the Greek IEEE Chapter Computer Society. He also serves as a Board Member and Deputy Vice-Chair for the Greek Research and Education Network (GRNET-Greek NREN, www.grnet.gr).

Contact Info:



www.cslab.ece.ntua.gr
pdsg.cslab.ece.ntua.gr

Computing Systems Laboratory
(Institute of Computer and Communication Systems)
National Technical University of Athens
Dept. of Electrical and Computer Engineering
Polytechniopolis Zografou, 15773 Athens, Greece

e-mail: nkoziris@cslab.ece.ntua.gr, nkoziris@cs.ntua.gr
Tel:+30-210-7721531, Fax:+30-210-7721292