OPECG-2009: Five-Day Technology Workshop

Optimizing Performance of Parallel Programs on Emerging Multi-Core Processors & GPUs (OPECG-2009)

Jointly Organized by

Centre for Development of Advanced Computing (C-DAC), Pune &
Indian Institute of Technology (IIT) MADRAS,

Dates : June 1-5, 2009, **Venue : Media Research Centre, Central Library, IIT-MADRAS**

Mode 1: Day 1: June 1, 2009 (Monday)

9:00 AM ~ 9:30 AM: Reg. (Mode 1 & 2)	**10:30 AM ~10:45 AM Coffee & Tea Break**
9:30 AM ~ 10:30 AM	**Welcome and Inauguration** • ***Prof. M. S. Shunmugam;*** Head, Dept. of Mechanical Engineering, IIT MADRAS • ***Prof. S.Santha Kumar***, Dean, Academic Course, IIT-MADRAS • ***Shri. M.R.Rajagopalan***, Director, C-DAC Chennai • ***Prof. R.KalyanaKrishnan***, Dept. of Computer Science, IIT-MADRAS • ***Dr.VCV.Rao*** Workshop Co-ordinator, C-DAC, Pune University Campus, Pune • ***Prof. N.Siva Prasad,*** Dept. of Mechanical Engineering, IIT MADRAS
10:45 AM ~ 11:30 AM	**An Overview of OPECG-2009:** Technical Programme &Hands-on Session
11:30 AM ~ 12:30 PM	**Classroom Lecture:** Introduction to Multi-Core Programming – Architecture –Overview 1
12:30 AM ~ 1:00 PM	**Classroom Lecture:** Prog. on Multi-Core Processors - OpenMP
Lunch: 1:00 PM ~2:00 PM	**Coffee & Tea Break: 4:00 PM - 4:15 PM**
2:00 PM ~ 4:00 PM	**Hands-on Session:** Programming Examples using Pthreads, MPI, OpenMP - Performance Issues
4:15 PM ~ 6:30 PM	**Hands-on Session:** Performance of Progs. on Numerical & non-numerical Comp. Pthreads; Multi-Threaded I/O, MPI-OpenMP, MPI-Pthreads

Mode 1: Day 2: June 2, 2009 (Tuesday)

9:00 AM ~ 10:00 AM	**Classroom Lecture:** Prog on Multi-Core Processors - Part-I: Pthreads
10:00 AM ~ 10:30 AM	**Classroom Lecture:** Prog. on Multi-Core Processors – Architecture Part-II: Memory Allocators & Performance Issues; Common Errors in Thread Prog.
10:30AM ~10:45 AM Coffee & Tea Break	
11:00 AM ~12:45 PM	**Keynote Talk (INDUSTRY): Intel, Bangalore** **Topic:** Tuning & Performance - Tools on Multi-Core Processors **Speaker:** **Malladi, Rama Kishan V**
Lunch: 12:45 PM ~ 2:00 PM	**Coffee & Tea Break: 4:00 PM - 4:15 PM**
2:00 PM ~ 4:00 PM	**Hands-on Session & Demonstration:** Programming Examples using Pthreads; OpenMP - Performance Issues; Example programs using Performance Visualization Tools- Intel Vtune Performance analyzer
4:15 PM ~ 6:30 PM	**Hands-on Session:** Performance Issues: Open source Software tools - PAPI - on Multi-Core Processors; Compiler Optimization Techniques; Examples using Multi-threaded I/O, MPI-OpenMP, MPI-Pthreads

Mode 1: Day 3: June 3, 2009 (Wednesday)

9:00 AM ~ 9:30AM	**Classroom Lecture:** Programming on Multi-Core Processors- Part-IV: Multi-Cores - Complier Optimization techniques; Mixed Programming Environment; Performance of Benchmarks on Multi-Cores -MPI-2
9:30 AM~10:30 AM	**Keynote Talk (ACADEMIC):** Performance of Compression Algorithms on Multi-Core Processors (Cell Processors) **Speaker:** Pallav Kumar Baruah ; Department of Mathematics and Computer Science; **Sri Sathya Sai University**, Anantpur, A.P.
Coffee & Tea Break: 10:30 AM - 10:45 AM	

Mode 1: Day 3: June 3, 2009 (Wednesday)

11:00 AM~12:00 Noon	**Keynote Talk (ACADEMIC):** Power Aware Speed up and Algorithm Based Transient Fault Tolerance in CMPs **Speaker:** Soumyendu Raha, SERC, **IISc,Banglaore**
12:00 Noon~12:45 PM	**Classroom Lecture:** Programming on Multi-Core Processors- Part-V – Intel Threading Building Blocks (TBB- Performance Issues)
Lunch: 1:00 PM ~ 2:00 PM	**Coffee & Tea Break: 4:00 PM - 4:15 PM**
2:00 PM ~ 4:00 PM	**Hands-on Session & Demonstration:** Programming Examples using Pthreads; OpenMP, Example programs using Multi-Threaded I/O, MPI-OpenMP, MPI-Pthreads; Performance of Benchmarks
4:15 PM ~ 5:15 PM	**Hands-on Session:** Application and System Benchmarks: Compiler Optimization Techniques - Performance of Micro & Macro Benchmarks; Thread Building Blocks- Performance issues; MPI-2 – Prog. & Examples
5:15 PM – 6:00 PM	**Invited Talk (ACADEMIC):** (Will be announced)
7:30 PM – 8:30 PM: **Banquet Dinner**	

Mode 2: Day 4: June 4, 2009 (Thursday)

9:00 AM ~ 9:15 AM: (Mode 2 Registration)	**Coffee & Tea Break: 10:30 AM - 10:45AM**
9:15 AM ~ 9:30 AM	**Classroom Lecture:** An Overview of OPECG-2009 (Mode 2 Prog.)
9:30 AM ~ 9:45 AM	**Classroom Lecture:** An Overview of GPU Computing - CUDA Hardware and Software - CUDA SDK, Example programs & Performance Issues
9:45 AM ~11:45 PM	**Keynote Talk (Industry):** High Perf. Computing based on GPGPU/ GPU Computing **Speakers: Mr.Sanjiv Satoor/ Mr.Phani K/Ms. Rupali**
11.45 AM ~12:45 PM	**Keynote Talk (ACADEMIC):** Implementing Regular and Irregular Operations on the GPU **Speaker:** P.J. Narayanan**, IIIT, Hyderabad**
Lunch: 1:00 PM ~ 2:00 PM	**Coffee & Tea Break: 4:00 PM - 4:15 PM**
2:00 PM ~ 2:30 PM	**Hands-on Session - Demonstration (NVIDIA):** GPU Computing - **NVIDIA** - CUDA Programming; Example Programs
2:30 PM ~ 6:00 PM	**Hands-on Session:** Examples using GPU Computing – **NVIDIA** - CUDA Prog; Programming Examples based on Mixed Programming – Hybrid Adaptive Clusters (Intel TBB, CUDA Prog. MPI-CUDA, TBB-CUDA)

Mode 2: Day 5: June 5, 2009 (Friday)

	Coffee & Tea Break: 10:30 AM - 10:45 AM
9:00 AM ~ 9:15 AM	**Classroom Lecture:** An Overview of GPGPU - Stream Computing Software Stack; Brook+ Programming
9:15 AM ~ 9:45 AM	**Invited Talk:** An Overview of OpenCL (Open Computing Language); Data Parallel Programming Issues
9:45 AM ~11:45 Noon	**Keynote Talk (Industry): VizExperts; India** **Topic:** AMD Stream Computing; **Speaker:** Mr. Praveen Bhamarika
11:45 AM ~12:45 PM	**Keynote Talk (ACADEMIC):** Performance Issues- Reconfigurable Computing-FPGA Prog. **Speaker:** Yogindra Abhyankar, C-DAC, Pune
Lunch: 1:00 PM ~ 2:00 PM	**Coffee & Tea Break: 4:00 PM - 4:15 PM**
2:00 PM ~ 4:00 PM	**Hands-on Session - Demonstration:** Examples using GPGPU – Stream Computing; Example Programs on Hybrid Adaptive Clusters
4:00 PM ~ 6:00 PM	**Hands-on Session:** Programming Examples using GPGPU Stream Software Stack – Brook+ Prog.; Programming; Examples based on Mixed Prog. – Hybrid Adaptive Clusters (Intel TBB & CUDA Prog. MPI-CUDA, TBB-CUDA); Examples using GPGPU – AMD Stream Computing
6:00 PM ~ 6:15 PM	**OPECG-2009 Project Closure**