



GIAN Course on HPC Concepts & Practise
October 8-13, 2018

International Faculty
Prof. Ganesh Gopalakrishnan
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Salt Lake City, USA

Organized by
Dept. of Computer Science and Engineering
National Institute of Technology Calicut
NIT Campus P.O., Kozhikode-673601, Kerala, India

Sponsored by
Ministry of Human Resource Development (MHRD)
Govt. of India

COURSE SCHEDULE

Day	Date and Day	Timing	Session Topics	Faculties to be engaged
Day1	8th Oct 2018 Monday	09:00 -10:00	Registration	
		09:30 - 10:00	Inaugural Session	
		10:30 - 11:00	High Tea	
		11:00 - 12:30	Session #1: Basics of Parallelism, Scaling, Work/Span, Correctness and Performance Tools, Msg Passing/Shared Mem, Patterns	T Dr. Ganesh Gopalakrishnan, Utah, USA
		12:30 - 14:00	Lunch Break	
		14:00 - 15:30	Session #2: Nasty Realities of Parallel Computing including Nonlocal Accesses, False Sharing, Floating-point Non-reproducibility, Data Races in C/Java, Msg Races, Deadlocks, Tools ASan, TSan, ISP	T Dr. Ganesh G, Utah

		15:30 - 16:00	Tea Break		
		16:00 - 17:30	Session #3: Illustration of HPC Cluster@NITC, Linux basic commands, HPC Architecture, PBS Workload Manager Visit to Supercomputing Room Interactions/discussions with and among participants	T+L	Dr. Jayaraj P B, NITC
Day 2	9th Oct 2018 Tuesday	09:00 - 10:30	Session #4: OpenMP Programming, Reduction, Avoiding False Sharing, Atomic/Single/Critical	T	Dr. Ganesh G, Utah
		10:30 - 11:00	Tea Break		
		11:00 - 12:30	Session #5: Basics of OpenMP, Thread Safety, OpenMP Race Checking, Archer tool, Work Sharing Basics of MPI Programming	T	Dr. Ganesh G, Utah
		12:30 - 14:00	Lunch Break		
		14:00 - 15:30	Session #6: Try out Pthread programs on Workstations Try out simple OpenMP programs	L	Dr. Ganesh G, Utah Dr. Jayaraj P B, NITC
		15:30 - 16:00	Tea Break		
		16:00 - 18:00	Session #7: Try out OpenMP programs in Workstation	L	Dr. Ganesh G, Utah Dr. Jayaraj P B, NITC

Day 3	10th Oct 2018 Wednesday	09:00 - 10:30	Session #8: Parallel Programming on next generation Intel Xeon architecture	T	Mr. Austin Cherian Intel India	
		10:30 - 11:00	Tea Break			
		11:00 - 13:00	Session #9: Session #8: Parallel Programming on next generation Intel Xeon architecture	T+L	Mr. Austin Cherian Intel India	
		13:00 - 14:00	Lunch Break			
		14:00 - 15:30	Session #10: Try out OpenMP & MPI sample programs	L	Dr. Ganesh G, Utah Dr. Jayaraj P B, NITC	
		15:30 - 16:00	Tea Break			
		16:00 - 18:00	Session #11: Try out N-body simulation code using OpenMP & MPI	L	Dr. Ganesh G, Utah Dr. Jayaraj P B, NITC	
Day 4	11th Oct 2018 Thursday	09:00 - 10:30	Session #12: Details of MPI and OpenMP based parallel computing, N-body simulations	T	Dr. Ganesh G, Utah	
		10:30 - 11:00	Tea Break			
		11:00 - 12:30	Session #13: Parallel Programming Patterns Illustrated Using Threading Building Blocks (TBB).	T	Dr. Ganesh G, Utah	
		12:30 - 14:00	Lunch Break			

		14:00 - 15:30	Session #14: Introduction to heterogeneous computing	L	Mr. Bharat Kumar Sarma, Nvidia India
		15:00 - 16:00	Tea Break		
		16:00-16:00	Session #15: Hands-on programming on GPU	L+T	Mr. Bharat Kumar Sarma, Nvidia India
Day 5	12th Oct 2018 Friday	09:00 - 10:30	Session #16: Recent Trends in High Performance Computing	T	Mr. ManMohan, Lenovo India
		10:30 - 11:00	Tea Break		
		11:00 - 12:30	Session #17: Need for Frameworks: Illustration via the Iterated Local Champion Search (ILCS) System (Burtscher, Texas State U) and Uintah (Berzins, Utah) The Exascale Initiative and the Utah Gauss Group's Contribution on Race Checking and Floating-Point Reproducibility	T	Dr. Ganesh G, Utah
		12:30 - 13:30	Lunch Break		

		13:30 - 15:30	Session #18: Try out TBB Based programming	L	Dr. Ganesh G, Utah Dr. Jayaraj P B, NITC
		15:30 - 16:00	Tea Break		
		16:00 - 18:00	Session #19: Try out sample programs & N-body simulation in CUDA	L	Dr. Jayaraj P B, NITC Dr. Ganesh G, Utah
		18.00 - 18.30	Feedback session		Dr. Jayaraj P B, NITC Dr. Ganesh G, Utah
Day6	13th Oct 2018 Saturday	09:00 - 10:00	Online multiple choice examination long answer examination; one design problem to be solved end-to-end by the student		
		10.00 - 11.00	Valedictory Function: Certificate Distribution		