One Week Workshop on Super Computing
Organized under National Supercomputing Mission
(HRD Group)

Organized by

Centre for Development of Advanced Computing, Pune (India)
IIT Kharagpur.

Venue: IIT Kharagpur	**Duration:** From Date to To Date
Part I	**Introduction, SLURM:** Overview of HPC , Introduction to PARAM Shakti , Introduction to Slurm , Job submission Procedure for CPU and GPU nodes.(Day1-Day2 agenda)
Part II	**Parallel Concepts, Intel tools**: Shared Memory and distributed Memory parallelism, matrix multiplication and Parallelization, Intel tools and code Optimization Training, Intel AI Portfolio and Python Demonstration (Day3 –Day4 agenda).
Part III	**GPU:** Introduction to Image Processing, Parallelism in Image Processing using NVidia GPU**,** CUDAtoolkit and OpenACC,NVidia DL/ML (Day5–agenda).

** This is an online workshop so there will be no HANDS-ON sessions for the users. Only presenters will demonstrate and answer the questions. ******

Day 1-Day 2: 23/Nov/2020 – 24/Nov/2020

	Time (Hrs.)	**Lecture/Hands-on Session**
D A Y 1	**10:00 – 10:30**	Overview of HPC
	10:30 – 11:00	General Idea of PARAM Shakti
	11:15 – 13:00	Introduction to SLURM , slurm Batch script and Job Submission procedure . Sample batch scripts for Serial Job, Parallel Job, Hybrid Job (MPI+ OpenMP) and details about the different Flags of the each script.
	🍴 Lunch Break - 1.00 hr.	
	14:00 – 15:45	Lab Session: Job submission using sample batch scripts for Serial Job, Parallel Job, Hybrid Job (MPI+ OpenMP) for different Application (i.e GROMACS, LAMMPS) utilizing CPU Cores and CUDA cores.
D A Y 2	**Break**	
	16:00 – 17:00	Lab Session: Job submission using sample batch scripts for Serial Job, Parallel Job, Hybrid Job (MPI+ OpenMP) for different Application (i.e OpenFoam, NAMD) utilizing CPU Cores and CUDA cores.

Day 3: 25/Nov/2020

D A Y 3	Time (Hrs.)	Lecture/Hands-on Session
	10:00 – 11:00	Shared Memory Parallelism with OpenMP.
	11:15 – 12:00	Distributed Memory Parallelism with MPI (Point to Point Communication)
	12:00 – 13:00	Distributed Memory Parallelism with MPI (collective Communication)
	🍴 Lunch Break - 1 hr.	
	14:00 – 14:30	Parallelization of Matrix – Matrix Multiplication
	14:30 – 15:30	Lab Session: Shared Memory Parallelism with OpenMP
	Break	
	15:45 – 17:00	Lab Session: Distributed Memory Parallelism with MPI

Day 4: 26/Nov/2020

D A Y 4	Time (Hrs.)	Lecture/Hands-on Session
	10:00 – 13:00	Intel tools and code Optimization Training • Intel® Parallel Studio XE 2019 • Intel® compiler for C++/Fortran and hands-on • Vectorization+ Intel® Advisor hands-on • Intel® MPI Library • Intel® VTune™ Amplifier and demo
	🍴 Lunch Break - 1 hr.	
	14:00 – 15:45	Intel AI Portfolio and Python Demonstration • Intel® Distribution for Python and demo • Intel® Data Analytics Acceleration Library and PyDAAL demo
	Break	
	16:00 – 17:00	Intel AI Portfolio and Python Demonstration • Deep learning frameworks optimized by Intel • Intel OpenVINO™ toolkit

Day 5: 27/Nov/2020

Time (Hrs.)	Lecture/Hands-on Session
10:00 – 13:00	Nvidia **(CUDA and OpenACC)**
	🍴 **Lunch Break - 1 hr.**

14:00 – 15:45	- Introduction and Parallelism aspects of Image Processing using GPGPU
	- Nvidia (DL/ML)
	    o What is GPU computing and why now?
	    o Deep Learning GPU Hardware

	Break

16:00 – 17:00	• Domain based high level intro:
	    IVA, Health Care
	    NVIDIA GPU clouds Inferencing (TensorRT)
	• Domain based high level intro: NVIDIA RAPIDS, RAPIDS and NGC

(The leftmost column spans all rows with the vertical text **D A Y 5**)