

# WORKSHOP ON PARALLEL COMPUTING WITH GPUS

## GCOE, IIT Bombay

Indian Institute of Technology Bombay (IITB) was awarded NVIDIA GPU Center (GCOE) in the year 2013. IITB hosts India's first GCOE that serves as a hub for all heterogeneous high performance computing activities in the country.

GCOE plays major role in promoting and supporting GPGPU computing by supporting HPC infrastructure development, student internships and research publications. We develop awareness by organizing GPU workshops and Bootcamps, and collaborate with industries and government organizations all over India.

The workshop is aimed at introducing some of the key tools for parallel scientific computing and embedded computing. It will be conducted by a team of speakers from IIT Bombay, which will include lecture-cum demo sessions, accompanied by short hands-on sessions.

The workshop can be basically divided into three sessions:

- A. Parallel computing with MATLAB
- B. GPU computing with CUDA
- C. Embedded Super Computing with Jetson Tk1 board

### **A. Session on Parallel Computing with MATLAB:**

We look at the concepts of vectorization, parallel MATLAB computing on multiple CPU cores, and parallel MATLAB computing on GPUs. Participants will be taught how to parallelize loops, distribute or co-distribute large arrays over multiple CPUs, and speed up matrix computations on both CPUs and GPUs. All concepts will be demonstrated through hands-on sessions.

### **B. Session on CUDA and OpenACC:**

This part will focus on enabling users to write CUDA codes. This will be followed by an introduction to OpenACC -- a standard for parallelizing existing serial code. Participants will be introduced to the GPU concepts using single-block and multi-block vector additions. Shared memory examples, device query and error handling will be covered through demos and hands-on.

### **C. Session on Embedded Supercomputing:**

This part will cover features and applications of embedded supercomputing with NVIDIA's high-end Embedded platform Jetson TK-1. Jetson TK-1 gives high-performance with low-energy consumption for deep learning and computer vision applications. Participants will be introduced to hardware and software development on the Jetson TK-1 platform, enabling them to explore platform in their project research work.

### **Prerequisites for the workshop:**

1. All participants should bring their own laptops.
2. Familiarity with basics of MATLAB and C language programming.
3. MATLAB and Parallel Computing Toolbox should be available for Session A.
4. PC/Laptop with Linux (CentOS preferred) platform with GPU cards installed.

**Kindly note that the registration is free for both faculty and students.**

### **Contact Address**

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