A Short Course on
High Performance Computing
Architectures, Programming Models and Languages, Algorithms and Applications

15 – 16 February 2019
Supercomputer Education and Research Centre (SERC)
Indian Institute of Science (IISc), Bangalore, India

Background: High performance computing has been prevalent in many traditional scientific domains including climate modelling, computational fluid dynamics, design of materials, cosmology simulations, physics, mechanical and aerospace engineering simulations and also in modern-day data science, BigData, machine learning and AI based applications. Large parallel or supercomputing systems with up to 2 mega (10^6) processing elements are built to cater to the ever-increasing computing demands of these applications. These systems are highly heterogeneous with different kinds of processing elements, e.g, CPUs and GPUs. It is important to have the skills to program the combined power of such multiple processing elements for fast processing of the applications.

Supercomputer Education and Research Centre (SERC) of Indian Institute of Science (IISc) is a premier supercomputing or high performance computing Centre in the country offering diverse kinds of supercomputing services. It is a 24/7 data center facility and hosts a 1+ Petaflop supercomputer, one of the very few such supercomputers in the country. It also hosts a range of graphic workstations and visualization systems. It also provides services for parallel software management and offers high performance computing consulting services to the domain scientists.

SERC is also actively engaged in training and education in High Performance Computing (HPC) thereby disseminating knowledge in HPC to the practitioners and contributing to the building of a healthy HPC ecosystem in the country. It offers periodic courses in different topics of HPC including:

- introduction to parallel computing
- parallel programming models
- different kinds of parallel architecture
- MPI/OpenMP/CUDA programming
- parallel algorithms and applications
- profiling, debugging and optimization
- system administration of large-scale clusters
- deep learning and AI in HPC
- HPC in Industry
- hands-on exercises

Note: See page 2 for topics covered in this edition.

These courses are offered as either two-day or five-day courses. The two-day courses are offered in February mid, April beginning and September beginning. The five-day courses are offered in May end and November end.

As part of the periodic training schedule, SERC is conducting its next two-day course on February 15 and 16, 2019.

Course objective:

To introduce the fundamentals of parallel computing including parallel architectures, programming models and commonly used parallel programing constructs/libraries/languages and present motivating algorithms and applications.

Course Content: (Lectures will begin at 9:30 am)

Day1

- Morning: Introduction to architecture, programming models, MPI, OpenMP and CUDA
- Afternoon: Hands-on exercises

Day 2:

- Morning: Parallel algorithms and applications
- Afternoon: Hands-on exercises

Who will benefit from the course: Government, industry and consultant engineers and students at all levels (BTech/MSc/MTech/PhD) or Faculty from academic and technical institutions.

Course dates and venue:

Course Dates: **15-16 February 2019**

Venue: Supercomputing Education and Research Centre (SERC), Indian Institute of Science, Bangalore, India.

Course Instructors: Dr Aditya Krishna Swamy, Ms Akhila Prabhakaran, Prof Sathish Vadhiyar, Dr Yoginder Negi.

Registration:

Attending this course is ONLY by registration. The total number of participants for the course is limited to 100 with a reservation of 70 for the IISc personnel and 30 for the personnel from other Institutions. Registrations in both these categories will be accepted on a first-come first-served basis.

IISc Personnel: Registrations are free. Registration link to follow: https://bit.ly/2HfKrTV

Other organizations: Registration fee is

- Rs 2000 plus 18% GST for personnel from Government organizations.
- Rs 5000 plus 18% GST for personnel from Industry.
- Please register for the course online at the following link: http://iisc.online/shortterm/home.html

The last date for registration is **February 8, 2019.**

Accommodation will not be provided and the course fee does not include accommodation.