A Short Course on
Introduction to High Performance Computing

13 – 14 September 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 several supercomputing platforms viz. (a) SahasraT, a Cray XC-40, 1+ Petaflop supercomputer (b) DGX-1, an NVIDIA high-end solution for AI/DL based workloads. 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. Since September 2019, these facilities are open to Academic Institutions and Industry throughout the country.

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

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 mid-February, early-April and early-September. 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 during 13 – 14 September, 2019.

Course objective:

To introduce the fundamentals of parallel computing including parallel architectures, parallel programming principles and models and commonly used parallel programing constructs/libraries. Programming labs will provide experience in using the parallel programming constructs.

Course Content:

- Introduction to parallel computing architectures, parallelization principles
- Programming models, MPI, OpenMP
- Programming labs
- Programming Environment on Cray XC-40

For schedule, please visit: http://www.serc.iisc.ac.in/serc-workshops/

Who will benefit from the course: This course is intended for beginners wanting to get exposed to the parallel computing fundamentals. Students, faculty from academic and technical institutions, and staff from Government and industry wanting to know the introductory concepts can get benefited.

Prerequisites: Participants must possess basic programming knowledge in C/C++/Fortran and familiarity working in Linux environment.

Course dates and venue:

Course Dates: **13 – 14 September 2019. (9:30 am – 5:30 pm)**

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

Course Faculty:

Sathish Vadhiyar, Akhila Prabhakaran, Aditya K Swamy, J Lakshmi, Yoginder Negi (for lab sessions).

Registration:

Attending this course is ONLY by registration. The total number of participants for the course is limited to 100 with a reservation of 75 for the IISc personnel and 25 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: https://bit.ly/2P7PvxD

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 **8th September, 2019.**

Accommodation: Limited double-occupancy shared accommodation is available on campus, on PAYABLE basis, for academic participants from outside Bangalore. Cancellation charges applicable as per Guest House rules.