

Workshop on Parallel Computing - Algorithms and Applications

PCAA-99

June 21 – 25, 1999

Venue: CDAC, Pune

Organized by:
National PARAM Supercomputing Facility (NPSF)
Center for Development of Advanced Computing (CDAC),
Pune University Campus, Pune

Introduction : The availability of various parallel computers has created a number of challenges to solve large-scale scientific, engineering and commercial applications. For example: How should parallel computers be programmed? How can the quality of parallel algorithms be analyzed? How can the tools and libraries be used to extract performance? etc. The workshop will emphasize analysis of algorithms, performance of real-life applications, invited lectures and hands-on session on PARAM 10000.

Objectives : The objective of the workshop is to promote parallel computing in order to solve large scale scientific and engineering applications. Hands on sessions will be conducted to explain practical aspects of parallel computing. Invited lectures on real life scientific applications will give insight to the challenges. The workshop is meant for beginners as well as advanced level users of parallel computing systems. PARAM 10000 is C-DAC's 40 node (160 processor) 100 GF parallel supercomputer installed at the National **PARAM** Supercomputing facility (NPSF). Invited lectures on Parallel computing requirements, and role of high performance computing in scientific and engineering applications will be discussed.

Technical programme : The technical programme features a key-note address, eight invited lectures on parallel scientific computing, six classroom lectures on parallel computing, eight classroom lectures on numerical and non-numerical algorithms, two sessions on development and demonstration of selected parallel scientific and engineering applications on C-DAC's PARAM 10000. The workshop includes two and half hours hands on session on PARAM 10000 each day.

Topics covered :

- Models of parallel computers
- An overview of PARAM 10000
- Cost of message passing
- Scalability and performance studies
- Principles of message passing
- Principle of algorithm design
- Numerical algorithms
- Non-numerical algorithms
- Libraries and tools

Invited lectures :

- Atmospheric studies
 - Computational fluid dynamics
 - Seismic data processing
 - Genetic algorithms
 - Unstructured mesh computations
 - Chemistry
 - Graphics and visualization
 - Structural Mechanics
- Demonstration of above applications on PARAM 10000.

Hands-on session : Parallel programs in MPI

- MPI programs - point to point and global communication
- Algorithms using Message Passing Paradigms
- Numerical: Matrix multiplication, solution of matrix system of equations, sparse matrix computations.
- Non-numerical: Sorting and searching algorithms, graph coloring and graph partitioning algorithms
- Implementation of finite difference methods / finite element methods for Laplace equations

Distinguished speakers: Dr. Suhas Phadke (Western Geophysical, Texas), Dr. Narendra Karmarkar (TIFR, NCRA, Pune University), Prof. V. Raja Raman (Jawaharlal Nehru Centre for Advanced Science Research, IISc, Bangalore), Prof. A. S. Kolaskar (Bio-Informatics Centre, Pune University), Prof. S. R. Gadre (Department of Chemistry, Pune University), Prof. Pravir Dutt (Department of Mathematics, IIT-Kanpur), Dr. N. Balakrishnan (Supercomputer Education and Research Centre, IISc, Bangalore), Prof. Ravi S. Nanjundiah (Centre for Atmospheric & Oceanic Studies, IISc, Bangalore), Prof. Sanjay Mittal (Department of Aerospace and Engineering, IIT-Kanpur), Dr. T. S. Prahlad (National Aerospace Laboratories, Bangalore), Dr. V. Adimurthy (Vikram Sarbhai Space Research Centre, Trivandrum), and Prof. S. K. Dash (Department of Atmospheric Sciences, IIT-Delhi) from leading academic and research organisations will deliver invited lectures in PCAA -99 workshop.

Registration :

Registration is Rs. 5000/- per participant and Rs. 4000/- for each additional participant from the same organization. US \$250 per foreign participant and US \$200 for every additional participant from the same organization. The registration fee includes workshop proceedings, lunch/dinner, refreshments, and hands-on session. Registration fee for students, research scholars, and faculty members from Indian Universities is Rs. 3,000/- per participant. This registration fee does not include participation in the hands-on session. General information on PCAA-99 workshop can be found at:
<http://www.cdac.org.in/html/events/pcaa/index.htm>

Limited guest house accommodation facility may be available to participants. Guest house accommodation, at participants cost, can be provided subject to availability upon special request. Participants are encouraged to make their own arrangements for stay at Pune during the workshop.

Contact address :

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