**National Supercomputing Mission Sponsored**
**Faculty Development Program on High Performance Computing & AI**
**26-31 May 2025**

# Summary Report

**Faculty Development Program on High Performance Computing & AI**

**Date**: 26-31 May 2025

**Organized by**: Department of Computer Engineering, YBIT, Sawantwadi

**In Association With**: C-DAC Pune & NSM Nodal Center, Walchand College of Engineering, Sangli

**Sponsored by**: National Supercomputing Mission

## Objective

To provide faculty members with comprehensive exposure to High Performance Computing (HPC) and Artificial Intelligence (AI), through expert lectures, hands-on sessions, and interdisciplinary discussions.

## Our Patron

Shri. Achyut Sawant Bhonsale,Exec.Chairman, YBIT
Dr. Uday A. Dabade, Director, WCE Sangli
Shri. Amol Chavan,Member, Admin,Council,WEC,Sangli
Mr. Ashish Kuvelkar, Scientist G, C-DAC Pune

## Convenor

Dr. D. B. Kulkarni, WCE Sangli, NSM Nodal Centre Head

## Coordinator

Dr. U.B. Chavan, WCE Sangli
Dr. Raman R. Bane, YBIT, Sawantwadi

## Organizing committee

Ms. S.S. Naik (YBIT), Mrs. M.S. Khadilkar (YBIT), Mr. B.P. Sharaon(YBIT), Mrs. H.D. Naik(YBIT), Mrs. S.M. Sawant(YBIT) , Mrs. M.J. Jamsandekar(YBIT), Mrs. P.C. Dhamane (YBIT), Mr. V.A. Mahabal(YBIT), Mr. S.P. Sawant(YBIT)

## Event Highlights

### Inauguration & Dignitary Insights (Day 1)

- The event commenced with an inauguration ceremony and insightful speeches from eminent dignitaries, including representatives from C-DAC Pune, YBIT Sawantwadi, and Walchand College of Engineering.
- Day 1 set the tone with foundational sessions on **Parallel and Multicore Architectures** and **OpenMP**, concluding with a hands-on lab session.

### Program Highlights with Speaker Details

### Day 1 – May 26 , 2025 (Online)

- **Inaugural Session**:
  - **Mr. Ashish Kuvelkar**, Scientist G, C-DAC Pune, opened the session with his expert insights into India's supercomputing initiatives and the objectives of the National Supercomputing Mission.
  - **Prof. Uday A. Dabade**, Director, WCE Sangli, spoke about the institution's dedication to research excellence and capacity-building in advanced computing technologies.
  - The FDP Coordinators, **Dr. Umesh Chavan**, **Dr. Raman Bane**, also addressed the gathering, outlining the schedule and goals of the program.

- **Technical Sessions**:
  - **Session 1:** Introduction to Parallel Computing and Performance Metrics.
    **Speaker:** Dr. Amit Joshi (Dean Administration and IQAC, SPIT)
    Dr. Amit Joshi delivered an enlightening session on the foundational principles of parallel computing and Performance Metrics. His expertise in areas in Parallel & Distributed computing set the tone for an intellectually stimulating day.
  - **Session 2:** Shared vs. Distributed Memory System : CPU-GPU Architectures.
    **Speakers:** Mr. Kartik Narayane (Scientist C, CDAC Pune) . This session provided an in-depth understanding of the CPU-GPU Architectures along with their comparison in real time use. The speakers effectively clarified the concept of Shared memory Architecture and Distributed Memory Architecture. The speaker also clarified the concept of Hybrid Architecture.
  - **Session 3:** Supercomputers in India and the World: PARAM, Fugaku, Frontier, etc
    **Speakers:** Mr. Samir Shaikh (Scientist C, CDAC Pune). Expertise in Optimizing Large -Scale workloads, Parallel Computing AI/ML. This session provided information on various Supercomputers in India and World. Give informative knowledge about OpenFOAM, GROMACS and Application ,Tool, Programing Models-AI & HPC.

### Day 2 – May 27, 2025 (Online)

  - **Session 1**: Deep Learning server , use and demonstration
    **Speaker**: Prof. (Dr.) U.B.Chavan, WCE, Sangli. Prof. (Dr.) U.B.Chavan opened the day with a comprehensive session centered around : Deep Learning server , use and demonstration and its pivotal role in accelerating High-Performance Computing and Artificial Intelligence. Drawing on over 15 years of experience, he illuminated how GPU-based parallel computing is transforming

fields like Deep Learning, Quantum Computing, and Information Security. His session blended theoretical depth with practical demonstrations of DL Server, while his dynamic presentation and real-world research examples kept the audience fully engaged.

- **Session 2:** Convergence of HPC and AI : How are they related?
  **Speakers:** Dr. Sharad Sinha Associate Professor, Computer Science And Engineering IIT Goa.The evening session focused on Convergence of HPC and AI : How are they related? . Dr. Sharad Sinha brought in academic and industry perspectives. Along with that he also contributed with practical demonstrations and simplified explanations that made complex concepts accessible to all participants. Their collaborative teaching style created an engaging and productive learning environment.

- **Session 3:** Parallel Programming with OpenMP and MPI Concepts & Use Cases
  **Speakers:** Mr. Kartik Narayane, Project Engineer (CDAC-pune)
  Mr. Kartik Narayane led a session focused on Parallel Programming with OpenMP and MPI Concepts & Use Cases, guiding participants through foundational concepts and practical implementations. With 14 years of academic and research experience, he shared real-world insights into parallel computing techniques and their applications in data-intensive fields. His interactive approach and emphasis on performance optimization kept participants actively engaged throughout the session.

**Day 3 – May 28, 2025 (Online)**

- **Session 1:** Introduction to Parallel and Multicore Architectures
  **Speaker: Dr. Sudhir N. Dhage, (Dean-Administration & Quality Assurance Bharatiya Vidya Bhavan's Sardar Patel Institute of Technology ,Mumbai)**.His expertise in Applied Algorithms, AI/ML, Parallel and Distributed System. His explanation of distributed systems, algorithm design, and practical use-cases of MPI offered participants a solid foundation in high-performance computing. He also well explained key challenges in Parallel Computing. His deep academic experience and well-structured delivery added great value to the session.

- **Session 2:** Introduction to Parallel and Multicore Architectures
  **Speaker: Dr. Umesh B. Chavan, (WCE, Sangli).** He introduced MPI (Message Passing Interface) as a standardized and portable message-passing system designed to enable communication among multiple processes in a parallel computing environment. He explained how MPI supports efficient and scalable applications by facilitating both point-to-point and collective communications. The talk highlighted MPI's importance in high-performance computing and parallel programming contexts.

- **Session 3 :** Profiling and Benchmarking Tools **.**
  **Speaker: Ms. Jayashri Pawar (CDAC ,Pune) .** Ms Jayashri Pawar has huge knowledge of Hotspots analysis work in VTune. She explained the process of installation and running program with hpctoolkit using SPACK.She also well explain , How GProf is practically important for High-Performance Computing. Her deep knowledge of Intel Offload Advisor -Purpose will help more.

- **Session4:**Profiling and Optimizing Parallel Code
  **Speaker: Mr. Himanshu Sharma (CDAC ,Pune)** . He has deep knowledge about Profiling and Optimizing parallel code. His explanation of any point on GProf is too user friendly to understand all. He covered topics such as the Loading module for running VTune, Running matrix multiplication with VTune. Intel offload Advisor.

**Day 4 – May 29, 2025 (Offline)**

- **Session 1**: Computational Demands of AI: Deep Learning Models and Training Challenges (AI)
  **Speaker: Dr. Shitala Prasad, IIT Goa**
  Dr. Prasad delivered a comprehensive session drawing from his vast experience in Deep Learning, Computer Vision, Biometrics, and AI for Industrial Applications. He highlighted his research across interdisciplinary areas such as Underwater Vision and Soft Behavior Analysis, offering insightful discussions that merged theory with practical applications. With prior research positions at NTU Singapore and the University of Caen Normandie, his global perspective added immense value to the session. Participants gained an understanding of current trends in AI and computer vision research.

- **Session 2:** Hands-on: Running a Deep Learning Model on GPU using Google Colab or TensorFlow (AI)
  **Speaker :Dr. Shitala Prasad, IIT Goa**.
  Dr. Prasad led a hands-on session focused on Running a Deep Learning Model on GPU using Google Colab or TensorFlow (AI) . His structured delivery and practical examples captivated the audience, making complex technical content highly accessible.

- **Session3:**MPI
  **Speaker: Dr Rushikesh Joshi- Professor**, **Dept of CSE, IIT Bombay**
  Prof. Joshi, a highly esteemed academician, delivered an engaging and insightful session on HPC Programs, focusing on program structures, meta-modeling, concurrency, and design abstraction. His remarkable ability to seamlessly blend theoretical computing models with creative thought left a lasting impression on the participants.

**Day 5 – May 30, 2025 (Offline)**

- **Session 1:** MPI (Message Passing Interface)
  **Speaker: Dr. K. B. Manwade, Professor, Hirasugar Institute of Technology**
  Dr. Manwade conducted a detailed and insightful session on MPI, highlighting its significance in parallel computing environments. His explanation of distributed systems, algorithm design, and practical use-cases of MPI offered participants a solid foundation in high-performance computing. His deep academic experience and well-structured delivery added great value to the session.

- **Session 2 :** Hands-on Lab on MPI
  **Speaker: Dr. K. B. Manwade** .His brief explanation with a practical lab session on MPI conducted once again by Dr. Manwade. Participants had the opportunity to implement and experiment with the concepts discussed earlier, reinforcing their learning through real-time examples and exercises.

- **Session 3 :**OpenMP and use of deep Learning server-Hands-on
  **Speaker**: **Dr. Umesh B. Chavan** (Assistant Professor, Walchand College of Engineering)

The evening session focused on hands-on learning and practical applications of High-Performance Computing through the use of OpenMP. Dr. Chavan brought in academic and industry perspectives. Along with that he also contributed with practical demonstrations and simplified explanations that made complex concepts accessible to all participants. Their collaborative teaching style created an engaging and productive learning environment.

- **Session 4 :** OpenMP and Use of Deep Learning Server- Handson
  **Speaker : Prof. Aprupa Pawar** (Assistant Professor, Dept. of CSE, Walchand College of Engineering).Her session is followed to Dr U.B. Chavan .She covered the contain of Scope of data variables : Shared, first private, last private & Work Sharing :Scheduling both static-dynamic with example solving. Overall the session was well understood.

**Day 6 – April 13, 2025 (Online)**

- **Final Technical Session:** Fundamentals of Accelerated Computing with CUDA
  **Speaker:** Dr. Nilesh Pikle, IIIT Nagpur
  Dr. Pikle, a distinguished academician with more than 15 years of experience in teaching and research, led a dynamic session focused on accelerated computing using CUDA. His expertise in areas such as Deep Learning, Quantum Computing, and Information Security was evident throughout the session. Participants gained a clear understanding of CUDA programming fundamentals, GPU architecture, and their relevance in High Performance Computing. The hands-on aspects and detailed conceptual clarity provided during the session enabled participants to successfully claim NVIDIA Certification for "Fundamentals of Accelerated Computing with CUDA". The speaker's contributions were well appreciated for being both intellectually enriching and practically valuable.

**Outcomes & Impact**

- Enhanced conceptual and practical knowledge of HPC and AI tools like OpenMP, MPI, and CUDA.
- Exposure to real-world applications and interdisciplinary research from premier institutes.
- Strengthened faculty capabilities for teaching and research in emerging computing.

- **Valedictory Session**

  The valedictory session marked the formal conclusion of the week-long FDP and was graced by the presence of:

  - **Dr. Uday A. Dabade,** Director, WCE, Sangli
  - **Hon. Mr. Achyut Sawant Bhonsale sir,** Executive Chairman of Yashwantrao Bhonsale Education Society
  - **Dr. U. B. Chavan,** Co-ordinator of the FDP.
  - **Dr. Raman R. Bane sir,** Coordinator of the FDP and Principal of YBIT.
  - **Mr. G. A. Bhosale sir,** Vice Principal of YBIT

The session, **coordinated by Ms. Shrunkhala Naik**, began with the traditional lighting of the lamp ceremony.

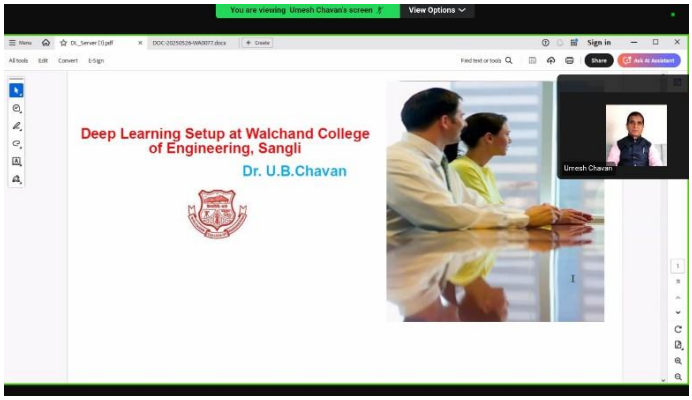
A gesture of hospitality was extended to the Chief Guest Dr. U. A. Dabade and the FDP Coordinator Dr. U. B. Chavan by presenting a shawl and coconut, along with a memento, signifying respect, a warm welcome, and appreciation for their gracious presence.

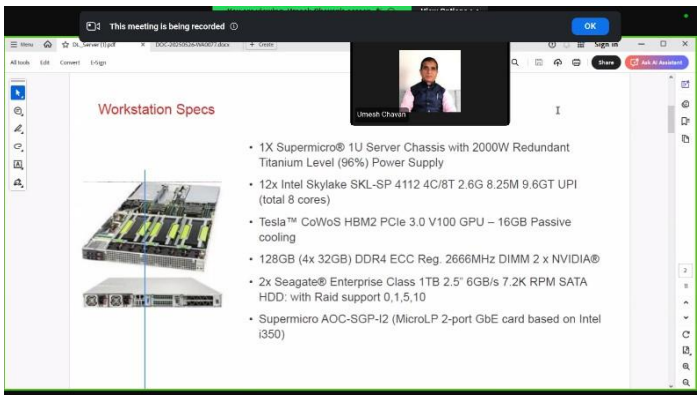
Selected participants were invited to share **feedback and reflections**, expressing appreciation for the quality of sessions, diversity of topics, and interactive learning environment.

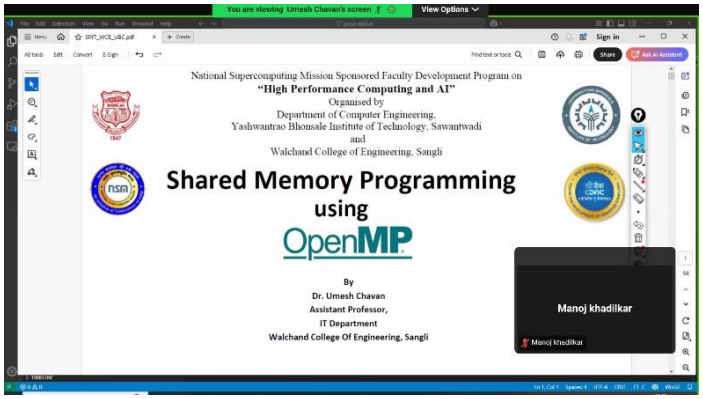
Following this, dignitaries on the dais shared their **closing remarks**, emphasizing the importance of such initiatives in strengthening the national HPC and AI landscape.

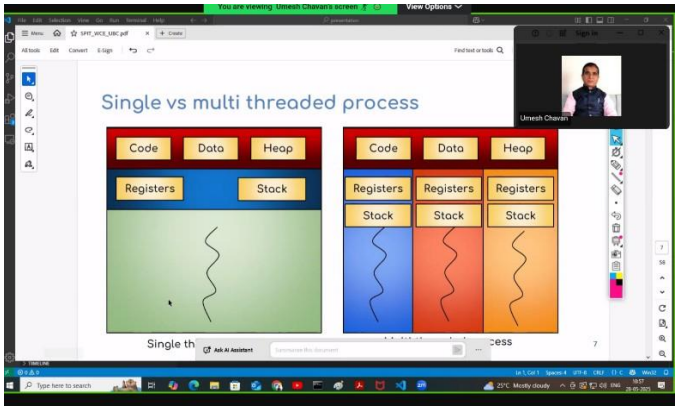
The event concluded with a heartfelt **vote of thanks** and best wishes for future endeavors in education, research, and innovation.

# Photo Gallery





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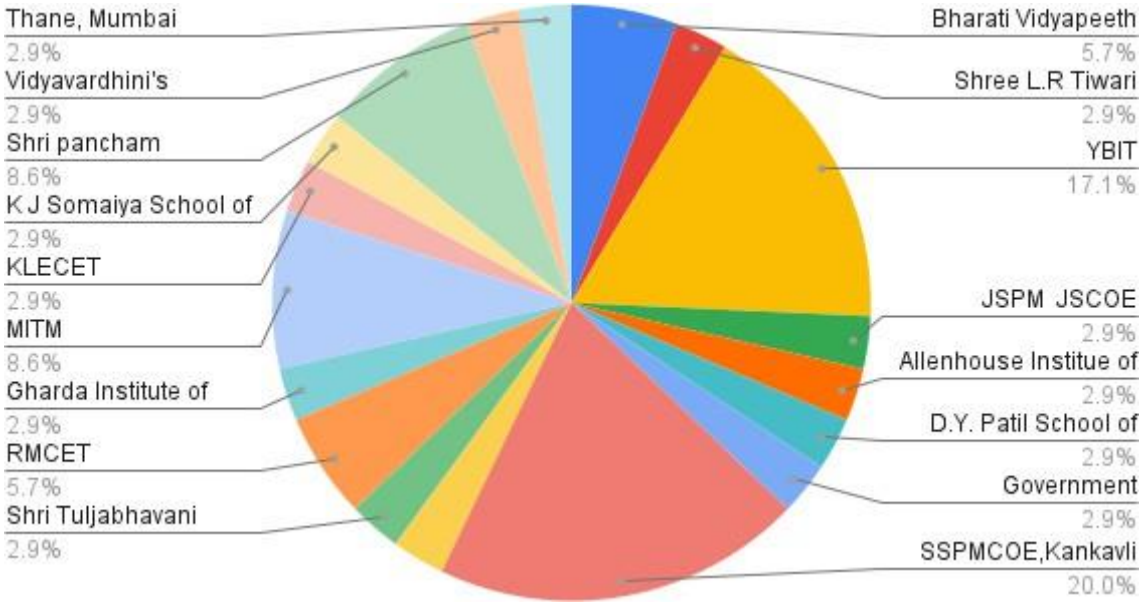
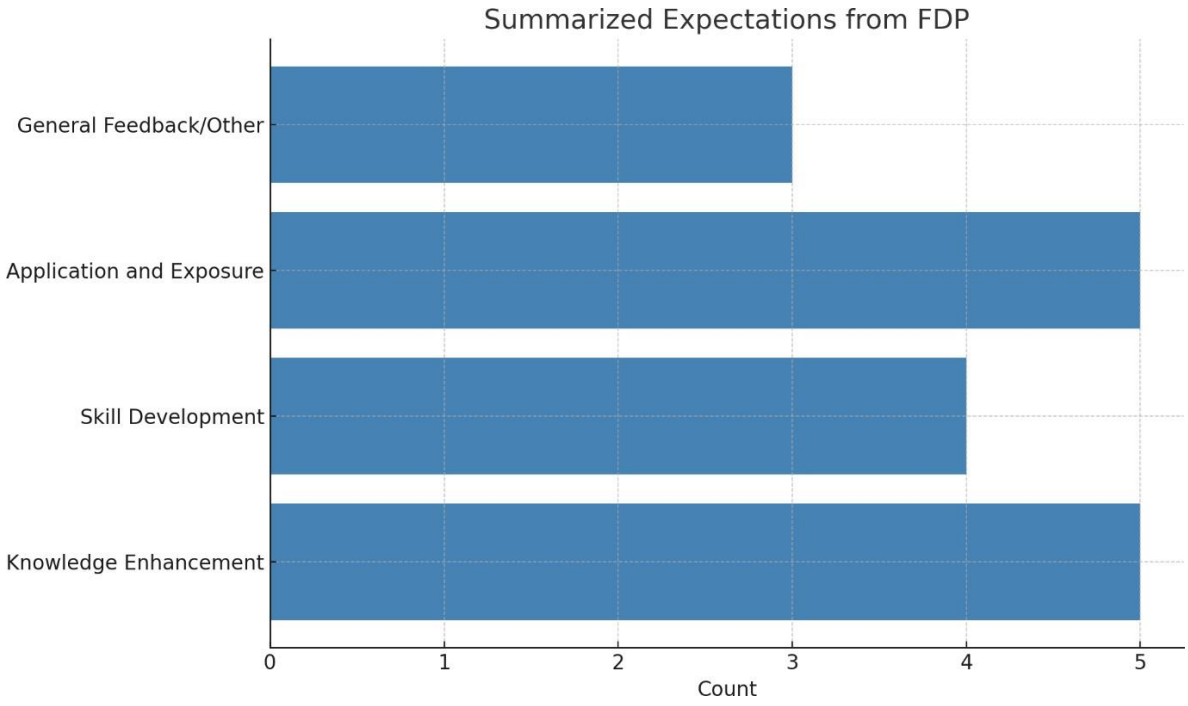
# Overall feedback of NSM HPC and AI FDP

## Participating Institutes




## Participant Expectations



# Conclusion

The *Faculty Development Program on High Performance Computing & Artificial Intelligence*, held from April 8–13, 2025, successfully brought together academic experts, researchers, and enthusiastic faculty participants for a week of intensive learning and collaboration. Through a balanced blend of expert lectures, hands-on lab sessions, and interdisciplinary discussions, the FDP achieved its core objective of deepening conceptual understanding and strengthening practical capabilities in the domains of HPC and AI.

Each session—whether focused on foundational tools like OpenMP and MPI, cutting-edge CUDA programming, or strategic themes like NEP implementation and curriculum integration—offered participants valuable insights into both the theory and real-world impact of high-performance computing technologies.

The active participation and thoughtful feedback from attendees highlighted the effectiveness of the program's structure, the relevance of the topics covered, and the expertise of the invited speakers. The collaborative support from C-DAC Pune, NSM Nodal Center at Walchand College of Engineering, and SPIT's dedicated organizing committee ensured smooth coordination and a high standard of delivery throughout the event.

This FDP not only enhanced the participants' knowledge but also inspired them to integrate advanced computing techniques into their teaching, research, and institutional initiatives. With this, the Department of Computer Engineering at SPIT reaffirms its commitment to fostering excellence and innovation in engineering education and research, in alignment with national missions and global trends.

We thank all contributors, speakers, and participants for making this FDP a truly impactful and memorable event