



Bansilal Ramnath Agarwal Charitable Trust's

VISHWAKARMA INSTITUTE OF TECHNOLOGY, PUNE-37

(An Autonomous Institute Affiliated to Savitribai Phule Pune University)

DEPARTMENT OF COMPUTER ENGINEERING

Activity Report on

“INDUSTRIAL VISIT TO CDAC, PUNE”

(AY: 2025-26 Sem:I)

Details of the Guidance Session are given below:

- **Title: Industrial visit to CDAC**
- **Topics to be covered:**
 - Information regarding 3 supercomputers in NPSF
 - Use of supercomputers in Drug generation pipeline in BRAF
- **Day & Date of Conduction: Friday, 31st October 2025**
- **Time : 2:30pm to 4:30 pm**
- **Resource Person : Avinash Bayaskar, Project Engineer, CDAC, Pune**
- **Target Attendees : SY, TY students (46)**
- **About the visit:**

This report details an industrial visit undertaken by Computer Engineering students from VIT Pune to the C-DAC Innovation Park in Pune. The visit provided an in-depth look at India's supercomputing infrastructure, including the National PARAM Supercomputing Facility (NPSF) and the specialized Bioinformatics Research and Applications Facility (BRAf). The primary objectives were to understand the history of Indian supercomputing, the architecture of modern High-Performance Computing (HPC) systems, and their real-world applications in scientific research. The visit covered key systems like AIRAWAT, PARAM Siddhi-AI, the indigenous PARAM Rudraserver, and the PARAM BioInferno cluster, providing a comprehensive overview of India's computational process.

- **Detailed Report:**

The visit focused on two primary facilities:

1. The National PARAM Supercomputing Facility (NPSF): Housing India's most powerful and indigenously built supercomputers.
2. The BRAf Lab: A specialized centre demonstrating the use of HPC in bioinformatics and life sciences.

We were given a tour of the data centre housing some of India's most powerful machines, which are used by approximately 1,500 users from government labs, IITs, NITs, and private companies.



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1. The National PARAM Supercomputing Facility

1) AIRAWAT

AIRAWAT (AI Research Analytics and Knowledge Dissemination Platform) is India's premier AI-focused supercomputer, available for private sector use at a cost approx. ₹160/hour.

- Global Rank: It was ranked 75th in the world in the June 2023 Top500 list.
- Architecture: The system consists of 90 parallel servers, primarily NVIDIA DGX A100 systems. We learned that AIRAWAT and PARAM Siddhi-AI are connected in a hybrid topology.
- Performance: AI-centric (mixed-precision) performance is a staggering 600 AI Petaflops.
- Technical Specifications: Node Specs: Each DGX A100 server node is a powerhouse with 1 TB of RAM and eight NVIDIA A100 GPUs, each GPU having 80 GB of HBM2 memory. The entire cluster operates on a Linux-based environment.

2) PARAM Siddhi-AI

This national supercomputer is used primarily by government organizations and academic institutions for R&D.

- Global Rank: Achieved a rank of 63rd in the November 2020 Top500 list.
- Architecture: Built on the NVIDIA DGX architecture.

3) PARAM Rudra

A key highlight was seeing the physical hardware developed under the 'Make in India' initiative. We were shown the PARAM Rudra, C-DAC's indigenous server platform. This is the base compute node used in the latest PARAM systems.

4) PARAM BioInferno

This cluster is used for Biomedical research and life sciences at BRAF has speed of nearly 150 Teraflops.

Real-World Applications & Impact

The staff shared several high-impact projects:

1. Home Ministry: An active NLP project is underway for translation of Indian languages.
2. Telecom Department: A recent project used facial recognition to validate SIM card registrations. This system processed a massive database and successfully identified individuals who had fraudulently obtained multiple SIMs using the same Aadhaar card, leading to FIRs being filed.



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2. Bioinformatics Research and Applications Facility (BRAAF)

A dedicated part of our visit was to the BRAAF Lab, which demonstrated a direct application of supercomputing in life sciences.

- Purpose: The BRAAF provides a dedicated HPC platform for researchers in genomics, molecular dynamics, and computational drug discovery.
- Key System: PARAM BioInferno cluster.
- BRAAF ICE Cloud: They have developed their own private cloud service called the Integrated Computing Environment (ICE), allowing researchers to provision and manage their computational resources.
- Real-World Applications:
 - a. Genomics: Analyzing Next-Generation Sequencing (NGS) data.
 - b. Molecular Dynamics: Simulating how proteins fold and interact, which is key for drug discovery.
 - c. Drug Discovery: Conducting computational studies, such as research on the SARS-CoV-2 virus and in-silico screening of potential drugs.
- **Data Center Operations (Cooling & Power)**

We were told about the two primary cooling methods in use:

1. Liquid Cooling: A more efficient method where coolant is piped directly to the high-heat components (CPUs/GPUs).
2. Air Cooling: Traditional data center air conditioning, managing the ambient temperature of the room.

The temperature is always kept below 22° C. The scale of the operation is immense. We were told the monthly electricity bill for the facility is approximately ₹1 Crore, with a single server node consuming around 6.5 KWh.

- **User Access Model**

The staff explained the user access workflow:

1. Users are given access to a personal directory on the supercomputer.
2. A wide range of scientific applications and libraries are pre-installed and optimized.
3. If a user needs to install new software, they must request permission from the C-DAC admin team to ensure system stability and security.

- **Student Feedback Analysis:**

This visit was a significant enhancement to our traditional classroom learning. The session was highly interactive, and the ability to see the physical server racks, cooling infrastructure, and indigenous PARAM Rudra hardware provided a level of understanding that theoretical lectures cannot. It was inclusive, accessible, and sparked a strong interest in HPC, parallel computing, and data center operations. The real-world examples, like the SIM card fraud detection, made the impact of this technology immediately clear and provided valuable context for our future endeavors in computer engineering.






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Pictorial Moments of the Activity



Event Coordinators
Dr. Deepak T. Mane 
Dr. Ranjeetsingh S. Suryawanshi 
Dr. Rakhi J. Bhardwaj 


Head of Department
Dr. Sandip R. Shinde



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DEPARTMENT OF COMPUTER ENGINEERING

INDUSTRIAL VISIT

Date: 31/10/25

Visit to : C-DAC Innovation Park, Panchawati, Pashan, Pune-411008

Day & Date : Friday, 31/10/2025 Time-2.30 pm to 4.30 pm

Note : I Card is compulsory at the time of visit

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Sumit
Swaroop
Aayush
Ishan
Varun
Harsh
Ayush
Mayank
Yeshwant
Prajwal
Arnav
Sharwill
Kavya
Aayush
Roshani
Nikhil
Shukti
Hariom
Nandita
Chaitanya
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Shivani
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