



Rajeev Motwani building

Areas of Research

IITK CSE department is actively involved in research in various fields of Computer Science. The faculty is involved in both theoretical as well as experimental research.

- ❖ Software Engineering and Language
- ❖ Computer Architecture
- ❖ Operating Systems
- ❖ Information & database Systems
- ❖ Computer Security & Cryptography
- ❖ Algorithms & data structures
- ❖ Theoretical computer science
- ❖ Artificial Intelligence
- ❖ Compiler Design
- ❖ Biometrics
- ❖ Complexity theory
- ❖ Networks and Mobile computing
- ❖ Machine learning
- ❖ Computer Graphics and Vision

Computer Science and Engineering

About Us

Indian Institute of Technology Kanpur was the first Institute in India to start Computer Science education in the country. The initial courses were started at IIT Kanpur in August 1963 on an IBM 1620 system installed in the nation's first "computer classroom". In 1971, the Institute initiated an independent academic program, leading to Ph.D and M.Tech degrees. The undergraduate program leading to B.Tech Degrees started later, with the first batch graduating in 1983. The department was formally established in 1984. Many of the nation's leading experts, educationists and consultants in computer science today are the alumni of this department. Currently, the department has a faculty of 22 whose interests span almost all areas of Computer Science. In addition, the department has two chaired Professors positions and some visiting/adjunct faculty members.



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Recent Research and Developments

Major Breakthrough in theory

One of the major outstanding problems in the area of computational number theory was solved by one of the faculty member recently. The problem was whether a number could be tested for primality in polynomial time. This is considered the most important research result during last 15 year in the area of Theoretical Computer Science.

Smart Card Technology Development

A standard for smart card operating system has been developed which is used by the government of India for all their smart card based applications. A smart card operating system has also been implemented which is compliant to this standard. This technology is in the process of being commercialized.

Computer System security

Recently, a center on computer security has been set up. This center aims to promote research in all aspects of computer security. Department has already made several contributions in this area including designs of new private key cryptosystems, packet filtering system, etc.

Language Technology

Development of Indian language technology has been one of the major activities at IIT Kanpur. Some path breaking contributions have been made in Indian language coding

(ISCII), keyboard design, transliteration, OCR machine translation, Linux ware, NLP, Indian scripts on Linux, Web content creation and search. Some of our landmark achievement is: GIST multilingual technology, AGLABHARTI & ANUBHARTI MACHINE aided translation strategies and popular web sites such as Gita-supersite.

Medical Application

The medical applications group supported by media lab Asia is developing a portable mobile model of printing healthcare delivery which uses ICT and digital devices to contact individual requiring medical attention with doctors who are remotely studies. The 'Sehat Saathi' software being developed will allow at the backend for diagnoses and treatment if real-time connectivity is not available then the patient is virtualized and the doctor give advice based the data gathered about the patient.

Biometric

Multipurpose Multimodal Human Identification System is being developed at IIT Kanpur. The primary aim is to design a robust system which is capable of handling problems like security, personal, verification/identification and other related applications. It consists of three modules- weaker modules that contains least features, medium level module containing more features, while strong features module that is packed with most of the features. The various traits that are considered are Face, Iris, Signature, Fingerprints and Ear. Finally, these traits are integrated together to achieve the maximum reliability and accuracy.

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Wireless Networking

Wireless networking research aims at making telecom affordable to rural areas that cannot be served profitably by conventional wireless technologies. A large scale outdoor experiment is being conducted to assess viability of using IEEE 802.11 technology for this purpose. Work in progress includes: wireless networks monitoring, MAC and routing protocol design, and novel application for wireless networks. This is the largest outdoor multi hop system anywhere in the country.

Facilities

Networks

CSE department is equipped with 100 mbps switched network. All systems (server & clients) are equipped with 100 mbps Ethernet cards. CISCO Catalyst 2900 switch is acting as back bone switch.

Servers

The CSE lab provides NFS, SMTP mail, DNS DHCP, NIS (YP) MySQL database server, Tomcat servlet runner, FTP server, Intranet website, Internet website, NTP, pop & I map services. Multiple Xeon based Linux server provide NFS Services for all CSE Lab users.

Clients

Most of the CSE-Lab clients are multi boot systems. Sixteen SUN workstation having Solaris 9 are also being used in the Lab. Twenty Opteron based multi boot system are running Linux, Solaris 9, Java desktop, Windows 2000 and Fedora Core 3. Most of the PCs in offices are equipped with laser printer and DVD ROM cum CD-Writer unit.

Sun Grid

Sun grid has been established in the department with funding from Sun Microsystems, USA. The grid has 20 workstation based on Opteron (64 bit AMD processor) and it is available to all the users who want to do research and explore the area of High Performance Technical Computing. The department is recognized as the "Sun Regional Academic and Research Partner for Excellence in Grid Computing".

Hardware lab

The hardware lab in the CSE department is the state of the art lab equipped for embedded computing. The lab provides several FPGA based stations for hardware programmability. The lab is used both for UG education and research.

Faculty

Ajai Jain

Research Interests: Fault-tolerance in VLSI, Parallel Processing, Machine Translation

Amey Karkare

Research Interests: Compilers, Program Optimizations, Functional Programming

Amitabha Mukerjee

Research Interests: Artificial Intelligence, Geometric Modeling, Robotics

Anil Seth

Research Interests: Logic in Computer Science.

Arnab Bhattacharya

Research Interests: Database, Data Mining, Sensor Network, Bioinformatics

Dheeraj Sanghi

Research Interests: Computer Networks, Protocols, IPv6, Telecom Regulation.

Harish Karnick

Research Interests: Automated & Commonsense Reasoning, AI.

Indranil Saha

Research Interests: Application of formal methods to embedded and cyber physical systems and Robotics.

Mainak Chaudhuri

Research Interests: Computer Architecture.

Manindra Agrawal

Research Interests: Computational Complexity Theory.

Nitin Saxena

Research Interests: Computational Complexity Theory, Algebra, Algebraic Geometry

Phalguni Gupta

Research Interests: Sequential and Parallel Algorithms, Image Processing.

Piyush Kurur

Research Interests: Computational Complexity, Computational Algebra

Rajat Moona

Research Interests: Computer Hardware and Architecture, VLSI Design.

Rajat Mittal

Research Interests: Computational Complexity, Quantum Computing.

Raghunath Tewari

Research Interests: Computational Complexity Theory, Graph Theory.

Ratan K Ghosh

Research Interests: Parallel Algorithms, Parallel Processing, Genetic Algorithms

Sandeep Shukla

Research Interests: Cyber Security

Sanjeev Saxena

Research Interests: Parallel Processing, VLSI, Data Structures, Algorithms, Heuristics.

Satyadev Nandakumar

Research Interests: Theoretical Computer Science.

Shashank Mehta

Research Interests: Computational
Geometry, VLSI Testing.

Somenath Biswas

Research Interests: Complexity Theory,
Logic.

Subhajit Roy

Research Interests: Compilers, Program
Analysis & Code Optimization

Sumit Ganguly

Research Interests: Databases.

Sunil Easaw Simon

Research Interests: Game Theory,
Distributed Systems, Temporal Logics

Surendra Baswana

Research Interests: Graph Algorithms,
Randomized Algorithms

T V Prabhakar

Research Interests: Databases, Multimedia
Systems, Object Orientation and User
Interface

Vinay Nambodiri

Research Interests: Computer vision and
machine learning

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