Research Opportunities in CSE @ IIIT-D

Raghava Mutharaju,
Assistant Professor, IIIT-D

Getting to know the participants

- Current degree program

- Interests

Research Programs

- ## M.Tech by Research
  - Two year program
  - Less coursework and more focus on research (thesis)
  - Lower fee and higher scholarship
  - Can be converted to a full-time PhD after one year
  - Details at https://iiitd.ac.in/admission/mtech/2023/cse-research-details

- ## PhD
  - Two admission cycles in a year – March/April and Oct/Nov
  - Masters degree and a GATE score are not required
  - Stipend is provided and the tuition fee is waived
  - Details at https://www.iiitd.ac.in/admission/phd
  - Deadline to apply is Nov 27, 2023

Tips on acing the written exam/interview

- Written exam
  - Focus on the fundamentals (GATE syllabus)
  - Simple programming questions

- Interview
  - Prepare on topics relevant to your interests
    - Data Structures & Algorithms, Probability, Linear Algebra, Computer Networks, etc.
  - Focus on the fundamentals
  - Take time to understand the questions and answer them
  - Ask for clarifications and explain your thought process

CSE Ph.D. program

- PhD scholars in CSE department:
  - PM's fellowship: 2
  - CSIR: 2
  - IBM fellowship: 1
  - TIH Anubhuti: 8
  - Google Fellowship: 1
  - UGC: 8
  - Visvesvaraya fellowship: 1
  - AICTE Doctoral fellowship: 3
  - Many on Institute token, funded govt. and industrial projects
- Many best papers, and poster awards
- INAE's, ACM best thesis awards
  - Dr. Deepika Yadav (2021 Ph.D.) shares Honorable mention at ACM India 2021 Doctoral Dissertation Award
  - Dr. Maneet Singh (2022 Ph.D.) received the IEEE Biometrics Council Best Dissertation Award

Support to the PhD students

- INR 2.5 lakhs to attend conferences
- Yearly contingency amount of INR 20,000
- Hardware (laptop) support upto INR 50,000
- USD 1000 incentive for publishing at top venues
- Overseas Research Fellowship (upto six months)
- Only two semesters of TAship for students on funded projects

Countries visited by PhD students for presenting papers

- Several cities in India (CoDS-COMAD, BDA, HiPC, ICDCN, etc.)
- Greece
- France
- USA
- Israel
- Germany
- Taiwan
- Japan
- Ireland
- South Korea
- UK

Full-time positions after PhD

- Postdoc at the Arizona State University, USA
- Postdoc at KTH Royal Institute of Technology, Sweden
- Postdoc at the University of Maryland, College Park, USA
- Postdoc at MPI, Germany
- Faculty at University of Nevada, Reno, USA
- Faculty at IIT Gandhinagar, India
- Faculty at IISER, Bhopal, India
- IBM Research, India
- TCS Research, India
- Ernst & Young, India
- NIST, USA
- Naukri.com, India
- Mastercard, India
- Ericsson, India

Research Themes

Biomedical Engineering & Medical Informatics

Research areas

Eye Tracking, Healthcare, Physiological Signals, Biomedical Signal Processing

Faculty member

Angshul Majumdar, Debarka Sengupta, Jainendra Shukla, V. Raghava Mutharaju

Computer Graphics & AR/VR

Research areas

Geometry processing, ML in graphics, Virtual and augmented reality (VR/AR), Volume visualization

Faculty member

Ojaswa Sharma

Computer Networks & Communications

Research areas

Communication networks, IoT, Mobile computing, Mobile systems and middleware, Wireless network, Distributed computing, Mobile Computing, Pervasive computing, Sensing, Software-defined networking, Programmable data planes, Network function virtualization

Faculty member

Arani Bhattacharya Dhruv Kumar, Mukulika Maity, Piyus Kedia, Pushpendra Singh, Rinku Shah, Vivek Kumar

Computer Vision & Multimedia Computation

Research areas

Visual Recognition, 3D Vision, Learning with Limited Supervision, Deep Learning, Transfer Learning, Information Forensics & Security, Visual Surveillance, Visual Tracking, Steganalysis, Multimodal deep learning, Event detection, Multimedia systems, Hyper-spectral Imaging, Medical Imaging

Faculty member

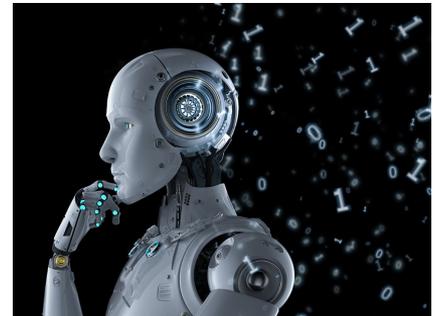A V Subramanyam, Saket Anand, Angshul Majumdar, Koteswar Rao Jerripothula, Rajiv Ratn Shah

Cybersecurity & Privacy

Research areas

Adaptive security, Biometric security, Blockchain, Cryptography, Cryptanalysis, Cyber security, IoT security, Network Security, Privacy, Protocols, Privacy, Anonymity, Security and privacy in online social media, Theory and practice of cryptography, Traffic analysis, Usable security

Faculty member

Arun Balaji Buduru, Donghoon Chang, Sambuddho Chakravarty

Data Management & Data Science

Research areas

Big data analytics, Complex network, Data-driven security, Data engineering, Data mining, Data privacy and security, Data science, Knowledge graphs, Natural language processing, Semantic Web, Social media analysis, Social networks, Entity Discovery and Analytics, Blockchain Data Management, AI for Data, Cognitive Information Systems, AI-driven scalable data systems, In-memory database

Faculty member

Arun Balaji Buduru, Bapi Chatterjee, Dhruv Kumar, Md. Shad Akhtar, Mukesh Mohania, Vikram Goyal, V. Raghava Mutharaju

Hardware, Robotics & Electronics

Research areas

Human Robot Interaction, Social Robotics, Hardware Security, Design of novel interconnect architectures for multi-core chips, Heterogeneous System Architectures

Faculty member

Jainendra Shukla, Sujay Deb

HCI & Human Centered Computing

Research areas

HCI4D, Public Health, Education

Faculty member

Dhruv Kumar, Jainendra Shukla, Pushpendra Singh

Machine Learning & AI

Research areas

Pattern classification, Low-rank matrix completion, Collaborative Filtering, Natural Language Processing, Information Retrieval, Scalable Machine Learning, Automated Machine Learning, Neural Architecture Search, EdgeAI, Human-Centered AI, Ethics

Faculty member

Angshul Majumdar, Bapi Chatterjee, Dhruv Kumar, Jainendra Shukla, Md. Shad Akhtar, Pushpendra Singh, Rajiv Ratn Shah, Saket Anand, V. Raghava Mutharaju, Vikram Goyal, Vinayak Abrol
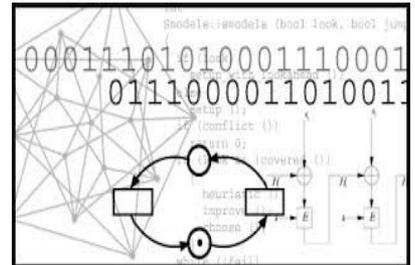
Theoretical Computer Science

Research areas

Algorithm design and analysis, Algorithm engineering, Combinatorial optimization, Complexity theory, Discrete and computational geometry, Graph theory, Online algorithms, Quantum computing, Parameterized Algorithms

Faculty member

Debajyoti Bera, Supratim Shit, Diptapriyo Majumdar, Rajiv Raman, Syamantak Das

Signal Processing

Research areas

Eye Tracking, Healthcare, Physiological Signals, Biomedical Signal Processing

Faculty member

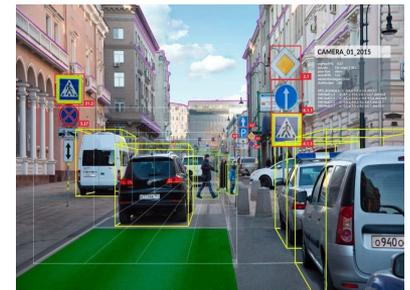Angshul Majumdar, Koteswar Rao Jerripothula, Rajiv Ratn Shah, Vinayak Abrol

Software Engineering & Programming

Research areas

Parallel programming models, Runtime systems, Code search and comprehension, Domain specific languages, Parallel programming, Concurrent Data Structures, Learned Data Structures, Ptrogram analysis and verification, Program optimization. Cloud computing, Deterministic execution, Memory safety, OS design, System Security, Virtual Machines
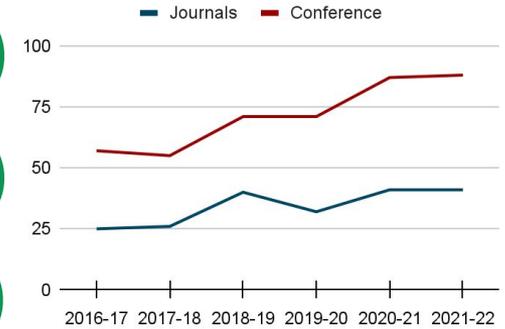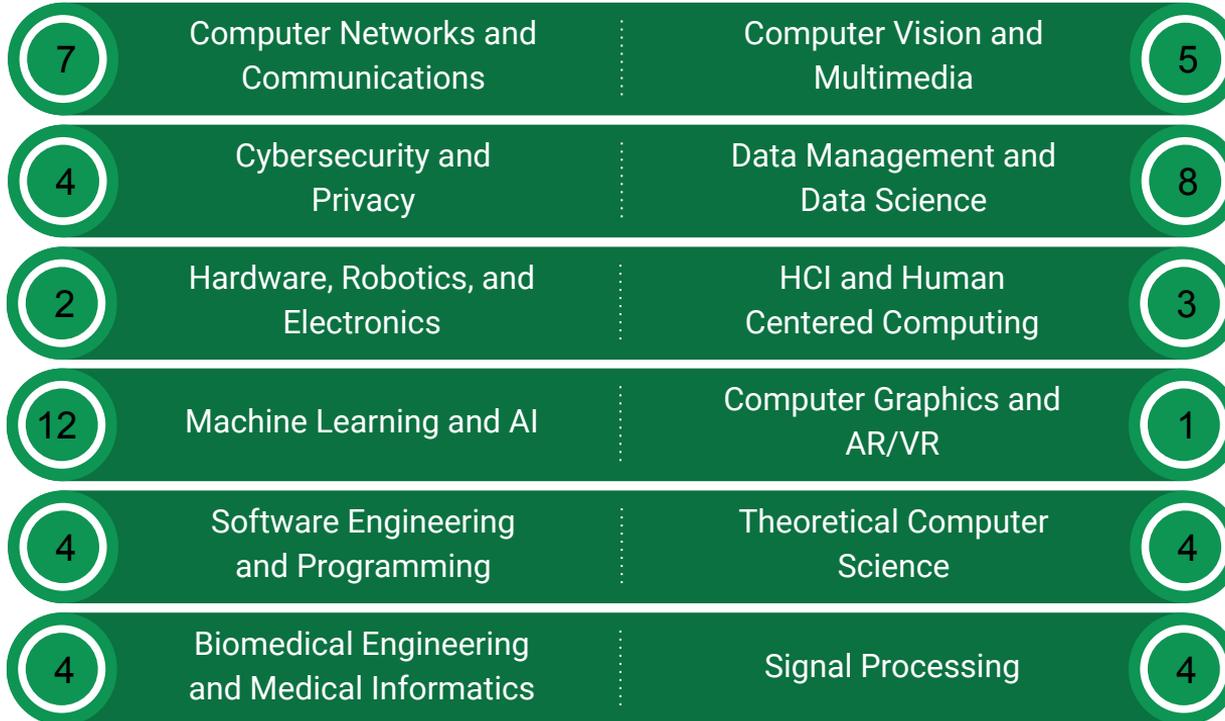
Faculty member

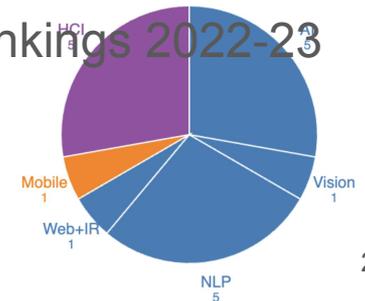Bapi Chatterjee , Vivek Kumar, Pankaj Jalote, Piyus Kedia

Faculty research

Faculty involved with cutting edge research in diverse areas within CS

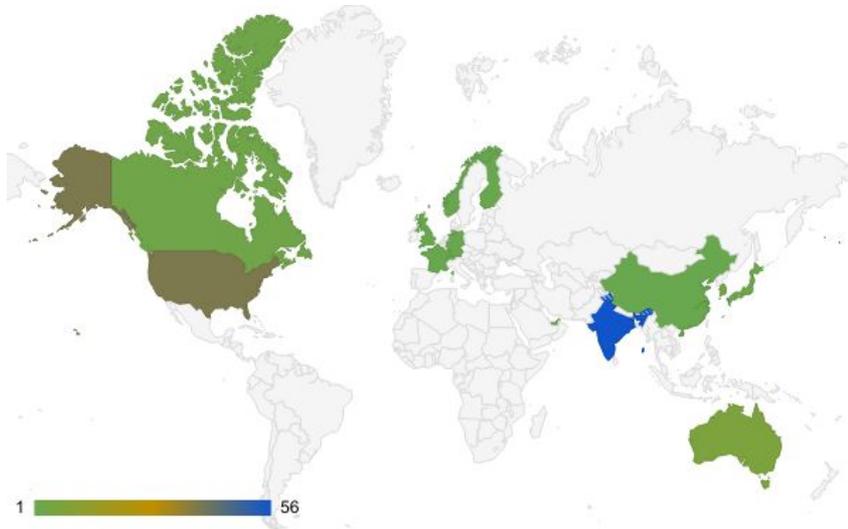|			
7	Computer Networks and Communications	Computer Vision and Multimedia	5
4	Cybersecurity and Privacy	Data Management and Data Science	8
2	Hardware, Robotics, and Electronics	HCI and Human Centered Computing	3
12	Machine Learning and AI	Computer Graphics and AR/VR	1
4	Software Engineering and Programming	Theoretical Computer Science	4
4	Biomedical Engineering and Medical Informatics	Signal Processing	4

5th in India:
CSRankings 2022-23

External collaborations

- We collaborate actively both within and outside India
  - **National**: ISI Kolkata, IITs, IISc Bangalore, IIIT-H, NIT Durgapur, DTU, MLNMC Allahabad, etc.
  - **International**: Europe, USA, Asia-pacific.
  - **Industry / Institutes**: IBM Research, MPI Germany, Berkeley Labs, AIIMS Delhi, Facebook, Wildlife Institute of India (WII) Dehradun, Delhi Police, Wipro Research, Adobe, etc.

(Some of the) Research Labs

- Cross-Caps Lab (Dr. Vinayak Abrol)
- Distributed Computing and Learning Lab (Dr. Bapi Chatterjee)
- Graphics Research Group (Dr. Ojaswa Sharma)
- Human-Machine Interaction Lab (Dr. Jainendra Shukla)
- High Performance Computing Lab (Dr. Vivek Kumar)
- Knowledgeable Computing and Reasoning Lab (Dr. V. Raghava Mutharaju)
- Laboratory for Computational Social Systems (Dr. Shad Akhtar)
- Multimodal Digital Media Analysis Lab (Dr. Rajiv Ratn Shah)
- Melange Lab (Dr. Pushpendra Singh)
- Program Analysis Group (Dr. Rahul Purandare)
- Visual Media and Signals Lab (Dr. Koteswar Rao J.)
- Theory Group (Dr. D. Bera, Dr. R. Raman, Dr. S. Das, Dr. D. Majumdar, Dr. S. Shit)
- Visual Conception Lab (Dr. A. V. Subramanyam)

Research Centers @ IIIT-D

- Infosys Centre for Artificial Intelligence (CAI)
- Centre for Quantum Technologies
- Centre of Excellence in Healthcare
- Centre for Design and New Media
- Centre of Excellence in Sustainable Mobility
- Centre of Technology in Policing
- Centre of Excellence on Light Fidelity
- DataKart Centre of Excellence
- Centre of Excellence in Human Computing

Thanks

- Explore the CSE department/institute website

- Explore the campus

- Talk to us and the PhD students