DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
IIT KANPUR

The Satya and Rao Remala Foundation established a chair award to improve resources and opportunities for students & researchers through initiatives, scholarships, and programs in AI, aimed at fostering innovation and excellence in healthcare.

Dr. Rajeev Alur received the prestigious **Knuth Prize** for the introduction of novel models of computation which provides the theoretical foundation for analysis, design, synthesis and verification of computer systems.

Key Highlights

1. Success story of our Alumna.
2. A deeper insight into faculty research by Prof. Urbi Chatterjee.
3. Innovative course launch for both UG and PG students.
4. The ICPC world finals.
5. Conferences and workshops.
6. The convocation ceremony.
7. Appointment Announcement.

Dr. Priyanka Golia has won the ACM India **2024 Doctoral Dissertation Award** for her dissertation "Functional Synthesis via Formal Methods and Machine Learning". She was advised by Prof. Subhajit Roy from IIT Kanpur and Prof. Kuldeep Meel from the University of Toronto.

Abhishek Bhowmick has been honored with the **Young Alumnus Award** for his groundbreaking contributions to theoretical computer science and his entrepreneurial achievements.

A Message From The Head

Prof. Surender Baswana

After seven months we are really excited to announce the release of the 2nd volume, issue 7 of our departmental newsletter. Being a globally recognised leader in Research and Education our department has always shown progress in every aspect ranging from launching of new programmes to establishment of advanced research centres. This edition is packed with thrilling stories and stirring updates from our students, alumni as well as our faculties.

In the last seven months, our department has celebrated several significant achievements both by our faculty and students. The graduating batch took home several prestigious awards by dint of their hard work and dedication thereby upholding the name and legacy of our department.

Along with our students our faculty community are equally dedicated to the pursuit of excellence – from research and teaching to worldwide collaboration with industrial partners , they have set new bench-marks in their respective fields.

This year our department has secured not just one or two but all three institute level awards for excellence in teaching -- “Gopal Das Bhandari Memorial Distinguished Teacher Award” to Prof. Purushottam Kar; “IIT Kanpur Distinguished Teacher Award” to Prof. Mainak Chaudhuri; “1989 Batch Faculty Award” to Prof. Debadatta Mishra.

Our alumni have always made us proud with their research work. For the second consecutive time the department also achieved the “ACM 2024 Doctoral Dissertation Award’’ by Dr. Priyanka Golia. Prof. Rajeev Alur received the prestigious Knuth prize for his outstanding contributions to the foundation of computer science.

We therefore always strive to create an inclusive environment where everyone feels valued and empowered and therefore we invite all students, visitors and researchers, to explore the exciting opportunities in our department as we continue shaping their future.

SUCCESS STORY OF OUR ALUMNA

From root to recognition

By

Priyanka Golia

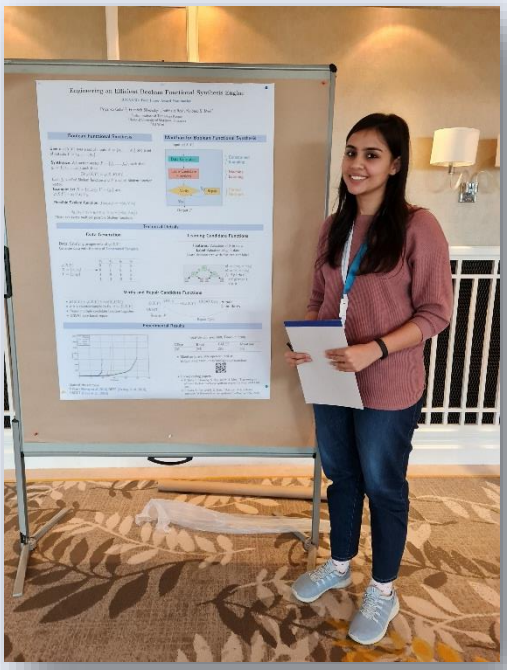
Dr. Priyanka Golia with Prof. Subhajit Roy and her lab mates

How was your journey as a student in the CSE department IIT Kanpur ?

My journey as a student in the CSE department at IIT Kanpur is not unique. Like many Ph.D. students who did not have prior experience studying at IITs, I struggled during the first year, particularly with the coursework. It was an intense and challenging period, but in retrospect, those courses laid a strong foundation for me. At the time, I disliked (or hated) them, but now I am grateful for that experience. When I say I struggled, it wasn't related to grades—I actually earned a perfect 10 CGPA in my first semester at IITK. My challenges were more about engaging with professors and lacking the confidence to discuss my “foolish” ideas. I had to put in more effort and spend more time than my peers to build a solid base and keep up.

From the second year onwards, while my colleagues began diving into "real" research, I was still trying to figure out my own path. Like many students today, I was torn between algorithms and AI/ML and had no understanding of formal methods. I decided to talk and discuss with faculty members about their research areas. To my surprise, I found inspiration after a discussion with Prof. Subhajit Roy.

Although I hadn't taken any of his courses or interacted with him before, our 60-minute conversation gave me the “kick” that I needed. He introduced me to "formal methods" and many problems his group was exploring. Most importantly, I felt comfortable sharing my stupid ideas with him without fear of being judged. This led to our decision to work together—he became my advisor, or perhaps it would be more accurate to say that he chose me as his advisee. Soon after, we learned about the joint degree programme between NUS and IITK. Prof. Subhajit Roy and Prof. Kuldeep Meel were already collaborating on several projects. After discussions with both of them, I officially joined the NUS-IITK joint degree program and was co-advised by both. My first project took nearly 2.5 years to yield results, and when my paper was rejected by TACAS’20 despite receiving relatively positive reviews, I was devastated. I considered quitting the program; it was overwhelming. However, my advisors stepped in and reassured me that our work had great potential and that I was on the right path. Indeed, that work became the cornerstone of my Ph.D., leading to several follow-up papers, some of which received best paper nominations at top-tier conferences.



Was becoming a professor a career choice for you from the very beginning, or did the choice evolve over time? What motivated you to become a faculty?

Yes, I knew from the very beginning that I wanted to join academia; in fact, that was the main reason I decided to pursue a Ph.D. program. What motivated me to become a faculty member is my family background; I come from a family of teachers. Throughout my childhood, I witnessed the joy on the faces of my parents and grandparents when their students celebrated them around Teacher's Day. This inspired me from a young age to become a teacher myself. However, as I grew older, I became aware of other professions. Like many others, I decided to pursue engineering. Towards the end, I developed a passion for understanding why and how things work. Questions like "Why is this algorithm optimal?", "How can we solve certain problems?” intrigued me, and I decided to pursue Ph.D., but after the Ph.D., when I had to make a choice between Academia and Industry, my choice was clear. A faculty position is a role where both of my passions converge—I can engage in research and teach the young minds.

Can you tell us about your experiences from participating in the joint student program at NUS Singapore?

I highly recommend joining the joint degree program. Being co-advised by Kuldeep and Subhajit Sir, and being part of this program, gave me the freedom to explore different research topics and the chance to spend time at NUS. That experience provided me with great resources, exposure, and memories that I'll cherish for a lifetime. The program, along with my time outside Indian academia, gave me valuable insights into both academic and research life as a whole.

Now that you are a faculty of IIT Delhi, how do you plan to continue your professional relationship with IIT Kanpur in the future?

IIT Kanpur holds a special place in my heart, where I have cherished some of the most wonderful moments of my life. I am keen on maintaining a strong professional relationship with IITK in the future. We can certainly collaborate on various research projects, co-advise students, and explore many more opportunities together.

Any messages for the students of IIT Kanpur who wish to pursue higher education or aspire to become a faculty like you.

The key lessons I've learned and would like to pass on to new Ph.D. students are to carefully choose the right research area and advisor. Take the time to speak with faculty members and their research groups before deciding with whom you'd like to work for the next 4-5 years. Once you have an advisor and a research area or problem to focus on, consistency becomes crucial. There will be more setbacks than good days, so it's important to celebrate the good days and stay consistent through the tough times. The Ph.D. journey is long, and to succeed, you must find your own balance and resilience.

Could you share some of the most memorable moments with IIT Kanpur.

One of the most memorable moments from my Ph.D. was when we finally discovered the scalable algorithm for Skolem function synthesis using ML and formal methods. I clearly remember that in Prof. Roy's office, one side of the whiteboard always had a draft of the algorithm sketched out. Every time we found a counterexample or made an improvement, we would update it. This went on for about 8-9 months—yes, Prof. Roy kept the algorithm on his offices' whiteboard for that long! And then one day, we had it: an algorithm that was scalable, sound, and complete. That day, I felt joy, confidence, and nervousness all at once. Days like that are rare during a Ph.D., but they are what keep our spirits high. I'll never forget that time—the algorithm became the backbone of my Ph.D. thesis.

FOCUS ON FACULTY RESEARCH: SETTLOR

BY

Prof. Urbi Chatterjee

Prof. Urbi Chatterjee with her Research team

The Secure Embedded and Smart Things Laboratory (SETTLOR) at IIT Kanpur, established in March 2021, focuses on critical research in hardware and embedded system security, addressing challenges posed by emerging technologies. Key research areas include Acoustic Side-Channel Attacks, Physically Unclonable Functions (PUFs), Approximate Computing, and Network-on-Chip (NoC) security. SETTLOR collaborates with several funding agencies such as IIT Kanpur, C3i Hub, DRDO, SRC, ISEA, and the IITK-NYU Research Grant. The scholars of the lab are also supported through prestigious fellowships like the Prime Minister's Research Fellowship (PMRF) and TCS Research Fellowship. Currently, the lab consists of four PhD students, including one international student. SETTLOR has a strong track record of publications in prominent journals and conferences, including Springer Journal of Cryptographic Engineering (JCEN), IEEE Embedded Systems Letters, ACM Transactions on Embedded Computing Systems, Design Automation & Test in Europe Conference (DATE), IEEE HOST, and VLSI Design Conference (VLSID). With a commitment to advancing hardware security, SETTLOR is making a significant impact on securing embedded systems and continues to push the boundaries of academic and applied research, supported by both national and international collaborations.

Testimony from SETTLOR group members:

In my area of research, we are exploring a fascinating question: how can the sounds that devices make provide valuable information? We are particularly interested in a phenomenon known as "singing capacitors," where the pulse-width modulation used in CPU voltage control circuits results in unique acoustic emissions. These sounds, produced by capacitors oscillating at high frequencies, give us a distinct auditory signature of the device's operational state. By analyzing these sounds, we can uncover important details about the device's performance and functionality. This method is especially exciting for us because it enables non-intrusive monitoring and diagnostics, offering a fresh approach to evaluating and enhancing device's security through acoustic side channel analysis.

~~Oswa Amro

Physically Unclonable Functions (PUFs) present a unique approach by using intrinsic hardware variations to create a distinct device fingerprint. This fingerprint is crucial for applications like device authentication, random number generation, and intellectual property protection. Despite crucial advantages, PUFs remain vulnerable to several model-building attacks using machine learning. Our research aims to address these vulnerabilities by evaluating existing countermeasures, proposing new metrics for their effectiveness, and developing optimal solutions to bolster PUF resilience against advanced threats. ***~~Neelofar Hassan***

With Moore's Law reaching its limit, precision becomes a flexible and abstract concept, varying with application needs. Some tasks demand high precision, while others only require binary decisions. Can we exploit this variability to address the energy, performance, and security challenges of modern computing? We are working on developing secure and reliable approximate computing architectures to address these challenges. Our focus lies in advancing the broad area of power-aware computer architecture that not only aligns with the current constraints of computing but also opens doors to more sustainable and effective solutions in the era of Internet-of-things. ***~~Vishesh Mishra***

Few glimpses of the hardware setup at SETTLOR

In the realm of Network-on-Chip (NoC) architecture, have you ever imagined how an attacker can leak sensitive information just by observing the latency of their own packet on the network? We are particularly interested in the correlation between the packet latency and the secret information. Our research focuses on an in-depth analysis of this correlation and how much it can aid the adversary in leaking information. At the same time, we are also developing hardware-friendly countermeasures to disrupt this correlation. In summary, we focus on developing secure and sustainable NoC architectures that are resilient to micro-architecture timing attacks. ~~***Dipesh***

CODE, COMPETE, CONQUER

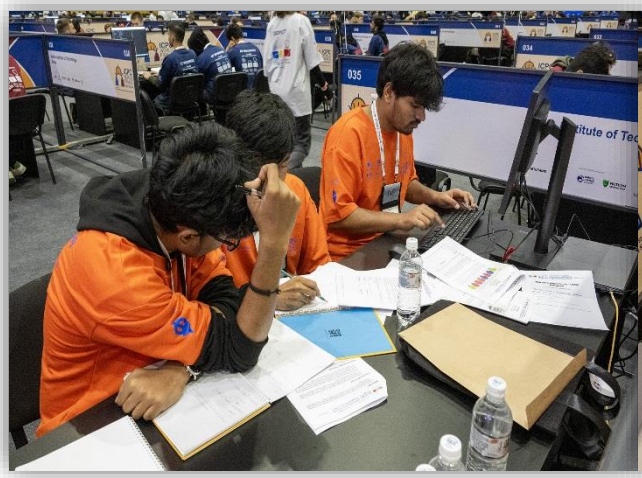
Our ICPC JOURNEY

By

Avi, Satyam and Udhav

The International Collegiate Programming Contest (ICPC) is one of the oldest, most prestigious, and yet most thrilling programming competitions held globally. This 5-hour competitive programming event brings together several university students from all over the world. In this brainstorming session, students are locked in a 5-hour battle of wits, entangled in intellects, racing against the clock to devise efficient solutions to complex mathematical problems. The competition progresses through various stages, leading to the World Finals, which are hosted in a different country each year. Our team, “facelessmen3.0” (inspired by the team names “Faceless Men” and “FacelessMen2.0” of our seniors), participated in the ICPC 2023 regionals and World Finals.

Our team was formed in January 2023. We began conducting timed practice contests in a common room, simulating the contest environment regularly throughout January and February. We registered for the ICPC Amritapuri and Kanpur regionals with our coach, Prof. Surender Baswana. In March, we took part in the preliminaries, proudly securing 4th place in both events, comfortably qualifying for the regional rounds. Our first on-site contest was the ICPC Amritapuri regionals in Bangalore in April.



We started strong, but as the contest progressed, we encountered planning challenges that led us to tackle multiple problems instead of concentrating on one. To complicate matters, a minor mistake in a seemingly simple brute-force problem resulted in a failed submission. In the end, we managed to solve seven problems, finishing in seventh place.

The very next week we had our Kanpur regionals. This time, we focused just on solving more problems, and not worry/panic about the time or others' performance.
We ended up solving a difficult problem early in the contest, then there was another unsolved difficult tree related problem, which Satyam was able to solve in the last hour. In between, there was a small bug in the solution of one of the easier problems, which was thankfully fixed 9 minutes before the contest got over. Ultimately, we solved 9 problems and secured 2nd place, narrowly missing out on the top spot to IIT Delhi's team, who completed the same 9 problems more quickly.

From these two regional results we qualified for the Asia West finals, which is a combined finals for the Asia West Region (India, Pakistan, Bangladesh, Afghanistan, and Iran). This competition was held in May, during the summer break. We adopted the very effective policy of not checking the standings table at all during the competition (to reduce anxiety during problem solving). This competition was one of our best experiences at an onsite contest, we solved a total of 8 problems, which was more than any of the other teams, and therefore we were comfortably in the first position, guaranteeing our chance for the world finals, which was our aim so far. It was a nail biting finish, with our last correct submission just 4 minutes before the 5 hour timer ended. We also were able to participate in the World Finals 2023 held in Egypt, here we solved 5 problems, but we took a larger time penalty, and therefore the IIT Delhi team won the Asia West Champion position in the world finals as they had a smaller time penalty. We finished with the 36th position in the world finals.

CELEBRATING THE HALL OF HONORS

- Kunwar Preet Singh was the recipient of President's Gold Medal for his highest grade point average (GPA) and his dedication and excellence in the Academic pursuits.

Kunwar Preet Singh

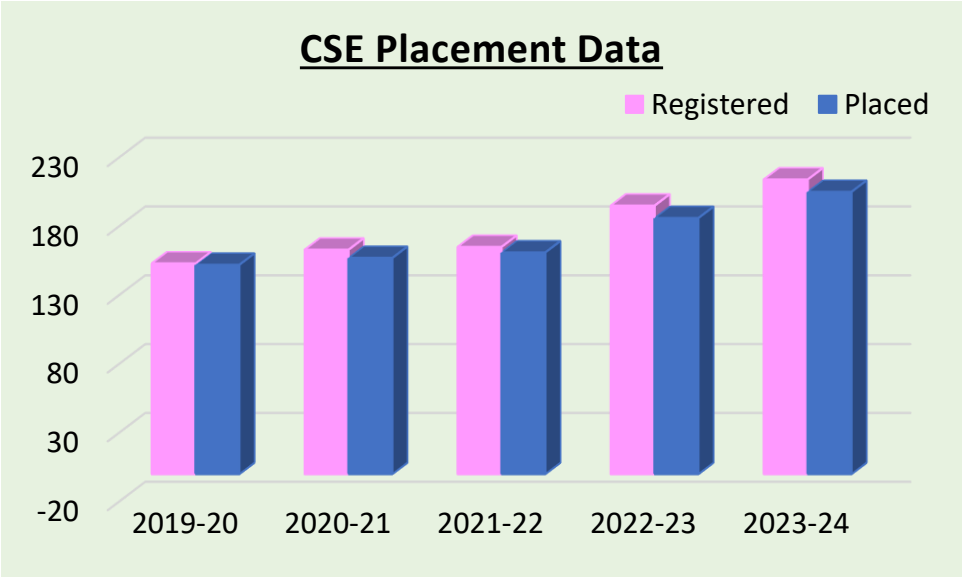
Sarthak Kohli

- Sarthak Kohli received Director's Gold Medal (4-year UG program) for exceptional academic achievement and outstanding performance.
- Hrishikesh Rajesh Terdalkar received the Best Software Award for his outstanding contributions in software development, innovation, and research.
- Tejas Ramkrishnan was awarded Ratan Swarup Memorial Prize again for outstanding academic achievements, research capabilities, or contributions to their field of computer science and engineering.
- Kush Shah has been honored with the Rajiv and Ritu Batra student Award in Cyber Security for his remarkable contribution towards promoting awareness about cyber security issues in relation to his exceptional academic excellence.

- L. Gokulnath received the Professor Putcha Venkateswarlu Memorial Gold Medal for achieving the highest cumulative performance index during his four-year bachelor's degree program, thereby demonstrating his academic excellence.
- Kanta Devi Malik Memorial Award and Chandra Prabha and Charan Dass Gupta Gold Medal was given to Jaya Gupta for obtaining the highest CPI among female students throughout her four-year undergraduate program.

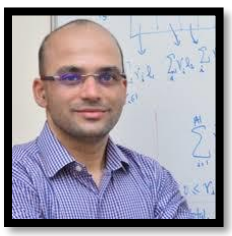
PLACEMENT SESSION

The Placement Cell, also achieved a huge increase in the number of recruiters this year.



Consistent Growth of on campus offers in the last 5 years

FACULTY IN NEWS



Prof. Ashutosh Modi has been appointed as Adjunct Faculty at AIT , Thailand.

Prof. Amey Karkare has been appointed as the Dean of Resources and Alumni of IIT Kanpur from July 2024.

Prof. Urbi Chatterjee has joined the faculty of Sitare University as a visiting professor.

APPOINTMENT ANNOUNCEMENT

Dr. M.A.K.P. Singh has joined the CSE department as Visiting Professor of Practice.

Dr. Gunjan Kumar has joined the CSE Department as an Assistant Professor.

Dr. Sayak Ray Chowdhury is appointed to the position of Assistant Professor in the CSE department.

New Course Created

Course Title: *Generative Artificial Intelligence* (CS787)
Course Instructors: *Prof. Arnab Bhattacharya & Prof. Subhajit Roy*

Dr. Arnab Bhattacharya

Dr. Subhajit Roy

Artificial Intelligence (AI) has become an important tool in almost every discipline. Recent advances in large language models (LLMs) has generated a lot of interest in generative AI techniques. In this course, the basics of generative AI will be covered. The course will have three broad dimensions. First, it will discuss how language models are trained and how they generate output. Next, the course will discuss effective ways of using these generative AI models. Finally, important applications using generative AI techniques will be discussed. Besides the lectures by the instructor, the students will be asked to present a recent paper in the class and to participate in the discussion. They will also be required to complete a group project that will provide them with a hands-on experience on working with the techniques taught in the class.

Course Title : *Large Language Models (LLMs) (*CS781)
Course Instructor: *Prof. Ashutosh Modi*

Dr. Ashutosh Modi

In recent times, Large Language Models (LLMs) have revolutionized the field of Natural Language Processing (NLP). However, the application of LLMs has not just remain limited to NLP but has also advanced other areas like Biology, Chemistry, Economics, etc. This calls for in-depth understanding of LLMs. This course will introduce the fundamentals of LLMs and go in-depth into various techniques to develop LLMs, scaling laws. It will cover various LLM architectures. It will teach how to fine-tune LLMs using parameter efficient techniques, how LLMs could be used in conjunction with external knowledge sources such as vector databases. We will have a more mathematical and rigorous approach towards understanding LLMs.

New Course Created

Course Title: *: Differential Privacy in Machine Learning*
Course Instructor: *Prof. Sayak Ray Chowdhury*

Dr. Sayak Ray Chowdhury

Differential privacy is a framework that provides mathematical guarantees that an individual's data cannot be re-identified from the output of a computation. It ensures that the presence or absence of a single individual in a dataset does not significantly affect the outcome of any analysis. Differentially private machine learning algorithms are designed to protect the privacy of individuals in the training data.

They use techniques from differential privacy to add noise while still allowing the algorithm to learn from the data and make accurate predictions or decisions. This course addresses this question by examining the limitations of simple approaches and advancing to solutions involving differential privacy. For example , How can we extract insights from a dataset containing sensitive information while ensuring the privacy of the individuals it includes? This course addresses this question by examining the limitations of simple approaches and advancing to solutions involving differential privacy. The class will cover fundamental principles of differential privacy, delve into algorithms for attaining privacy, and explore applications in statistics and machine learning. Students will complete mathematical exercises, engage in programming tasks, and undertake a final project as part of the course (in groups; depending on the size of the batch).

Course Title: *: Innovations in Computer Science and Engineering (CS801)*
Course Instructors: *Convener DPGC (Departmental Post-Graduate Committee.)*

This course is intended to introduce CSE PG students to cutting edge research directions as well as give them a chance to develop presentation skills by presenting work done by them or by their research group.

Building a secure digital future and innovating cyber defense: CCET 2024

C3iHub, the Technology Innovation Hub in Cybersecurity at IIT Kanpur, has organized a Mega Cybersecurity Event at IIT Kanpur to celebrate Cyber Security Awareness Month this October. This event marks a significant occasion in the celebration of Cybersecurity Awareness Month, aiming to facilitate meaningful discussions on emerging trends and threats within the cybersecurity domain, while exploring innovative solutions and protection strategies for real-world security incidents.

1.Create a platform for R&D, innovation, tech-translation, and product commercialization.

2.Generate a whitepaper on enhancing cyber defense and resilience from panel discussions.

3.Promote Made-in-India cybersecurity products.

4.Develop and improve cybersecurity and cyber threat awareness among attendees.

The inaugural conference was graced by Lt. Gen. M.U. Nair, Cybersecurity Coordinator of India, as the Chief Guest, along with Dr. Gulshan Rai, former National Cyber Security Coordinator and Ex-Director General of CERT-In, and Dr. Ajay Kumar, former Defense Secretary of India, as Guests of Honour. Some of the eminent key- note speakers of this event were Dr. Ajay Kumar(Former Defence Secretary), Dr. Charles Clancy (Senior Vice President And General Manager Of MITRE Labs, Chief Technology Officer), Major Gen P.K. Mallick VSM (Retired Major General Corps Of Signals), Brigadier Rajeev Ohri VSM (Veteran Retired Brigadier Corps Of Signals), Dr. Kris Gaj (Professor and Associate Chair for Graduate Programs at George Mason University), Dr. V. Natarajan (distinguished Scientist at the Society for Electronic Transactions and Security (SETS) in Chennai), Dr. Somitra Sanadhya (Professor in the Department of Computer Science & Engineering at IIT Jodhpur).

Dr. Debapriya Basu Roy (Assistant Professor in the Department of Computer Science and Engineering at IIT Kanpur),Robert Martin (distinguished Senior Principal Engineer at MITRE Corporation),Prof. Sandeep Kumar Shukla (Professor in the Computer Science and Engineering Department at IIT Kanpur) Prof. Adithya Vedapalli and Prof. Urbi Chatterjee of the CSE dept. shared their valuable insights on post quantum cryptology during the panel discussion session. Prof. Sandeep Shukla, Project Director at C3i Hub, shared valuable insights into the cutting-edge work being done by C3iHub researchers to tackle APTs.

During the closing ceremony, Prof. Manindra Agrawal, Director, IIT Kanpur and ex-officio Chairman of C3i Hub, expressed his appreciation by stating that events like these play a crucial role in fostering the exchange of ideas and building valuable connections. He expressed hope that C3iHub continues to host such conferences, establishing it as a premier event that brings together experts from various domains. Prof. Sandeep Shukla, Project Director of C3iHub delivered the closing remarks, “Over the past three days, we’ve hosted a remarkable conference, bringing together distinguished speakers from abroad, the Indian Armed Forces, and academia. They shared their expertise on four critical domains of cybersecurity. We look forward to continuing such impactful events in the future.” The conference was a tremendous success on emerging trends in cyber security.

ASEAN-India Women Scientists Conclave

The 1st ASEAN-India Women Scientists Conclave was held in Singapore in April 2024. This landmark event was organized under the India - ASEAN framework and was a significant breakthrough in fostering scientific collaboration among women from ASEAN countries and India. This conclave was collectively organized by Department of Science and Technology (DST) and Anusandhan National Research Foundation (ANRF) from India, along with Singapore's Agency for Science, Technology and Research (A*STAR) and the ASEAN Secretariat. The main motto of this event was to bolster better connectivity , co-operation , mobility amongst women in the fields of Science, Technology, Engineering, and Mathematics (STEM).

80 participants all over the world attended the conclave, including 19 women scientists and 5 officials from DST, India. Among the key speakers was Ms. Anita Gupta, Head of Climate Change, Energy, and Sustainable Technology (CEST) at DST, who highlighted the vast scientific opportunities and supportive programs available in India for STEM advancements.

Prof. Priyanka Bagade from IIT Kanpur represented India as an AI in Healthcare researcher in this Conclave. According to her this event was a knowledge-sharing session particularly in healthcare technology and hailed as a testament to the power of collaboration and the potential of women in science.

Additionally, the participants got the opportunity to visit High Commissioner of India in Singapore and interact with Dr. Ambule and his team, further strengthening bilateral ties.

Significant MoUs signed

- On May1, 2024, AlmaBetter Edutech Pvt Ltd, Bengaluru, signed a Memorandum of Understanding (MoU) with IIT Kanpur. The purpose of this partnership is to raise awareness among young people about emerging technologies such as AI and ML . Professor Ashutosh Modi will serve as the Principal Investigator (PI).

- NTIPRI, Ghaziabad entered into a Memorandum of Understanding (MoU) on 1st May 2024 with IIT Kanpur. This collaboration aims to work in areas such as information and communication technologies, mobile communication technologies, cyber space, associated standards, policy issues, and startups. Professor Sandeep Shukla will serve as the Principal Investigator(PI).

- On 2nd July 2024 William Marsh Rice University formalised an agreement with IIT Kanpur. The objective of this agreement was Inventions and Proprietary Information of Agreement for Visiting Personnel Using University Research Facility. Professor Nisheeth Srivastava will serve as the Principal investigator (PI).

- On July 19, 2024, the Ministry of Electronics and Information Technology (MeitY) ISEA Project Phase II and Phase III entered into a Memorandum of Understanding (MoU) with the Indian Institute of Technology (IIT) Kanpur. This agreement aims to foster Human Resource Development for a safe, trusted, and secure cyberspace; Grooming students towards products and solutions development in cyber security; Strengthening research and education in Information Security. The Principal Investigators (PIs) for this initiative are Professors Debapriya Basu Roy and Urbi Chatterjee.

- KAUSHALYA & National Forensic Sciences University entered into a MoU with IIT Kanpur on 26th July 2024 under the initiative of Professor Sandeep Shukla as the Principal Investigator(PI).

- On October 23, 2024, Bharat Educational Trust (BET) and IIT Kanpur embarked on an exciting new journey by signing a Memorandum of Understanding (MoU) with the visionary Prof. Arnab Bhattacharya as the Principal Investigator (PI). This agreement aims to explore broad areas of mutual interest and collaboration, covering terms and conditions, financial arrangements, modalities of cooperation, and the responsibilities and obligations of both parties. This partnership promises to unlock new potentials and pave the way for incredible advancements.

Highlights of the Achievements of our Faculties

Name: Prof. Indranil Saha
Award Name: Excellence in teaching Award at IITK, CSE for the year 2024.

Name: Prof. Debadatta Mishra
Award Name: recipient of 1989 batch faculty Award for the year 2024. This award recognizes innovative, technology-enhanced content improving undergraduate instruction while reducing faculty effort.

Name: Prof. Purushottam Kar
Award Name: recipient of the prestigious Gopal Das Bhandari Memorial Distinguished Teacher Award for the year 2024 as an accolade for his outstanding contribution to teaching and education.

Name: Prof. Rajat Moona (currently on deputation as the Director of IIT Gandhinagar)
Award Name: honoured with The Institute Fellow Award , 2024 for his impactful contributions to the Institute's growth and development.

Name: Prof. Angshuman Karmakar
***Award Name*:** received the Google India Research Award 2024, accompanied by an unrestricted research grant of US$20,000 as a valuable support to further his research work.

Name: Prof. Mainak Chaudhuri
Award Name: was honoured with IIT Kanpur Distinguished Teacher Award , 2024 for his outstanding teaching and mentorship within the institute.

Faculty contributions to Research and Development

Project Title: Identification Of Money Mule Accounts Using Machine Learning And Data Science
Funding Agency:RESERVE BANK INNOVATION HUB

Prof. Arnab Bhattacharya

Project Title: Gaṇita, Darśana and Kalā: Course Content Creation.
Funding Agency: IKS Division, Ministry of Education, Govt. of India
Project Title: BharatGPT: A Suite of Generative AI Tech for India
Funding Agency: DST, Govt. of India
Project Title: Sanskrit Knowledge Accessor
Funding Agency: MeitY, Govt. of India
Project Title : Advancement of NLP Techniques for Indian Languages with Focus on Bangla and Hindi
Funding Agency: SERB

Project Title: Setting up of Mission Coordination Cell (MCC) under National Quantum Mission
Funding Agency: DST, Govt. of India

Prof. Manindra Agrawal

Prof. Sandeep Shukla

Project Title: Research in Crypto Forensics and Development of a Crypto Crime Investigation Tool
Funding Agency: National Security Council Secretariat, Govt. of India

Project Title: Qualcomm Innovation Fellowship- India 2024
Funding Agency: QUALCOMM

Prof. Debadatta Mishra

Prof. Swarnendu Biswas

Project Title: Field-deployable quantum-enhanced sensors on integrated hybrid platform
Funding Agency: DST, Govt. of India

Prof. Amitangshu Pal

Project Title: Unconventional Physically Unclonable Functions For Micro Fluidics For Supply Chain Finger printing
Funding Agency: INDIAN INSTITUTE OF TECHNOLOGY

Prof. Urbi Chatterjee

Project Title: Programmable Cryptographic Processing Units To Enable Secure, Private And Quantum-Proof Computing
Funding Agency: INDIAN INSTITUTE OF TECHNOLOGY

Prof. Angshuman Karmakar

Project Title : Awareness Campaign - New-Age technologies
Funding Agency: ALMABETTER EDUTECH PVT. LTD
Project Title: NyayKosh: Multilingual Resources for AI-based Legal Analanalytics for India
Funding Agency: DST, Govt. of India

Prof. Ashutosh Modi

Project Title :Microsoft Research India Academic Summit
Funding Agency: MICROSOFT RESEARCH LAB INDIA PRIVATE LIMITED
Project Title: Qualcomm Faculty Award
Funding Agency: QUALCOMM

Prof. Subhajit Roy

Project Title: Information Security Awareness and Capacity Building for Hardware Security
Funding Agency: MeitY, Govt. of India

Prof. Debapriya Basu Roy

Prof. Urbi Chatterjee

Project Title: FPGA Implementation of Hardware Security Module
Funding Agency: JISA Softech, DSCI
Project Title: Developing Side Channel Secure Implementations of FIPS-203 and FIPS-204 post-quantum cryptography standard
Funding Agency: National Quantum Mission, DST

Talk , Seminars and Events hosted by CSE

- On August 1st, 2024**, Prof. Ashish Goel** from Stanford University presented a talk on the "Optimum Design of Automated Market Makers."
- Talk on "Secure and Sustainable Computing" was delivered by **Dr. Amit Kumar Singh** presently Reader (Associate Professor) at University of Essex, UK on 13th August 2024.
- **Dr. Tushar Athawale** ,a research scientist in the Visualization Group at Oak Ridge National Laboratory (ORNL) and Joint Faculty in Electrical Engineering and Computer Science (EECS) Department of the University of Tennessee, Knoxville presented a specialized talk on Statistical Analysis for Uncertainty Quantification and Visualization of Ensemble/Large-Scale Data on 19th August 2024.
- Presentation on "Two-party cryptography beyond computational assumptions: Some old and new results " was given by **Dr. Akshay Bansal**, a researcher at Virginia Tech dated 24th October 2024.
- An enlightening session titled "Inclusive Language Technologies for All: From India to the World" was conducted by **Dr. Nitish Gupta** from Google Deep Mind India (and also our alumnus) on 28th October 2024.
- Invited talk on "The side effects of knowing an algorithm" was delivered by the renowned researcher **Prof. Jaikumar Radhakrishnan** on 6th November 2024. He is presently associated with ICTS Bangalore.
- **Prof. Amartya Sanyal** currently a faculty at University of Copenhagen gave a invited talk on 12th November 2024 titled "Differentially Private Machine Learning with Correlated Data " .
- **Dr. Shivam Bhasin**, Principal Research Scientist and Programme Manager (Cryptographic Engineering) at the Centre for Hardware Assurance, Temasek Laboratories, Nanyang Technological University, Singapore, delivered a research presentation on November 27, 2024, titled "PQLeaks: Practical Side-Channel and Fault Attacks on Post-Quantum Lattice-based Cryptography."
- **Dr. Adarsh Barik**, a research fellow (postdoc) at the Institute of Data Science at the National University of Singapore, a prospective faculty candidate presented a seminar tilted " Optimization in Machine Learning - Convexity, Invexity and Beyond" on 3rd September 2024.
- CSE seminar on "Fair and Accurate Skin Disease Image Classification" by **Dr. Gagan Raj Gupta**, Associate Professor in the Department of Computer Science and Engineering at IIT Bhilai on 29 th august 2024.
- **Dr. G. Kumaresan**, who previously served as Guest Faculty in the Department of Computer Science at the Central University of Tamil Nadu, Thiruvarur, presented a talk on the topic "Cellular Automata in the Context of Cryptography and Artificial Intelligence."

Faculty Directory

Head of the Department

Dr. Surender Baswana (P)

Faculty members

Dr. Abhranil Chatterjee (AP)
Dr. Adithya Vadapalli (AP)
Dr. Amitangshu Pal (AP)
Dr. Amey Karkare (P)
Dr. Angshuman Karmakar (AP)
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Dr. Arnab Bhattacharya (P)
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Dr. Satyadev Nandakumar (P)
Dr. Sayak Ray Chowdhury (AP)
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Dr. Subhajit Roy (P)
Dr. Sumit Ganguly (P)
Dr. Sutanu Gayen (AP)
Dr. Sunil Simon (ASP)
Dr. Swarnendu Biswas (AP)
Dr. Sruti Srinivasa Ragavan (AP)
Dr. Urbi Chatterjee (AP)

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Visiting faculty

Dr. M.A.K.P. Singh
Dr. Gourav Sharma
Dr. Prateek Jain
Dr. Rajesh Kumar Gupta

Adjunct faculty

Dr. Shashank Srivastava
Dr. Snigdha Chaturvedi
Dr. Amartya Sanyal

Staff Members

Brajesh Kumar Mishra	(Sr. tech. superintendent)
Nagendra Yadav	(Tech. superintendent)
Yadubir Singh	(Superintendent)
Meeta Bagga	(senior technician)
Saurabh Malhotra	(Senior technician)
Shweta Sachan	(Senior technician)
Akshay Katiyar	(Junior assistant)
Rishi Dixit	(Junior assistant)
Surya Pratap Sharma	(Junior assistant)
Deepankar Chandra	(Junior Assistant)
Shivam Jaiswal	(Junior technician)
Saurabh Jaiswal	(Junior technician)
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Sheetal Singh	(Junior technician)
Ranjeet Kumar Verma	(Junior technician)
Akash Misra	(Project Engineer)
Rajesh Kumar	(Dep. Project Manager)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
IIT KANPUR

Faculty Advisors: Prof. Amey Karkare & Prof. Purushottam Kar
Edited & Designed by: Aparajita Mukherjee
For any suggestions/ queries contact us at: ***newsletter@cse.iitk.ac.in***