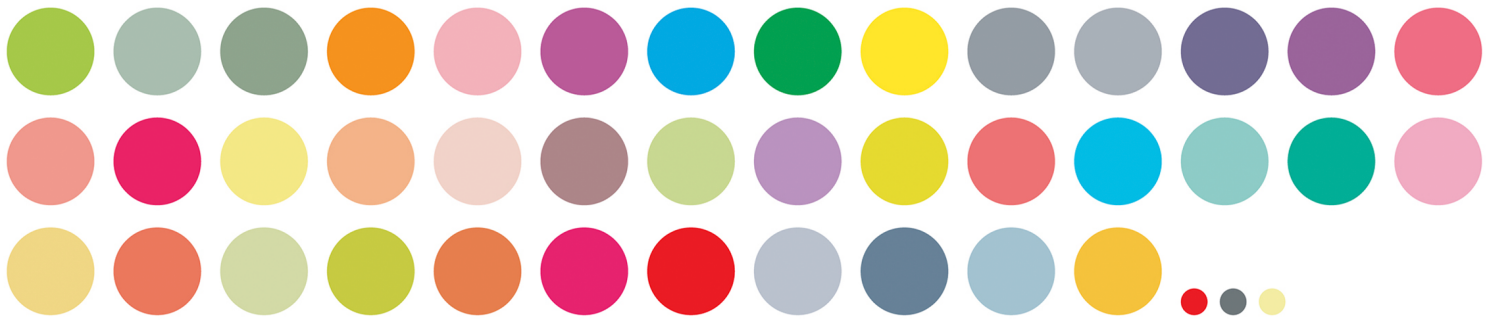




THAPAR INSTITUTE  
OF ENGINEERING & TECHNOLOGY  
(Deemed to be University)

# PULSE



ENGINEERING | SCIENCES | MANAGEMENT | LIBERAL ARTS

DISCOVER *Countless*  
**POSSIBILITIES**  
THAPAR INSTITUTE OF ENGINEERING & TECHNOLOGY

VOLUME- 15

# Rankings (NIRF and THE) and Accreditation



**NAAC A+**  
Accredited A+  
by NAAC



**#26**  
University  
Category



**#23**  
Engineering  
Category



2022 by subject (Global)  
Computer Science: **301-400**



2022 (Global)  
Engineering  
Electrical & Electronic: **451-500**



Accreditation Board for Engineering  
and Technology Accredited Program



National Board of Accreditation  
Accredited Department

"Eligible programs are NBA and ABET accredited"

# Expert Opinion



## Prof. Sanjeev Bedi

NSERC Chair in Immersive Design,  
University of Waterloo

Thapar, like many other engineering colleges, is facing a challenge to balance a traditional curriculum with needs of industry and expectation of graduates. Traditional curricula are rich in knowledge [theory] but the practical skills are limited to prescriptive labs and analytical project work, whereas industry today requires engineers who are problem solvers, can handle ambiguity and uncertainty, can work in teams, can make presentations, write reports, and are at ease with hands-on real-world problems.

The traditional curriculum is required for accreditation and a graduate engineer is expected to have a strong foundational knowledge in their discipline. Instilling the additional requirements of industry is a challenge. Thapar Institute, in recent times, has undertaken a two-pronged approach to meet the challenge.

1. Firstly, Thapar has forged partnerships with international institutes of repute to update the curricula to international standards. Currently, many students obtain foundational knowledge at Thapar during two years of engineering studies and then seamlessly transfer to reputed foreign universities to finish third and 4th year of studies. The students not only adapt to the changed environment but often excel attesting the quality of the foundational knowledge. The seamless transfer is a welcome outcome of the upgrade after traditional curricula.

2. Secondly, Thapar has recognised the lack of real-world hands-on exposure, within the traditional curricula and to address this launched an experiential learning initiative through the establishment of the “experiential learning center” [ELC). They have asked me to lead the ELC as I established a similar center at University of Waterloo in Canada. The mandate of the experiential learning center is to introduce real world problem solving in every semester of every program. A tall order but a worthy challenge.

Students join an engineering program with an aspiration to engineer great things. Building robots, super cars, smart applications in AI, crypto currency etc. are on their mind. However, in most engineering schools the first year of education mainly focuses on teaching mathematics and sciences with the goal of building a strong foundation. In second year as well, the focus stays on foundational knowledge, with more mathematics and more science. The students experience their first engineering experience in the later part of their engineering studies. By this time, over two years have passed.



CS students building and programming a robotic arm

The key goal of the ELC is to retain student enthusiasm, creativity, interest and ambition by allowing students to do engineering (appropriate) in every semester. ELC provides them with an exposure to engineering in a variety of ways. For example, Mechanical and Mechatronics engineering students hold dissection clinics in which students disassemble machines from bicycles to engines to transmissions and then reassemble the machines into a working artifact. In civil engineering students build a canoe using concrete and reinforcement and test their design in the pool. Similarly, in electrical engineering dissect and build an electric motor and computer science students learn to program a robot. All the activities are designed to take a day during which no other classes are held. Student response to the activities is very positive. The key outcome of the single day activity is that the students learn the vocabulary of a domain specific to their discipline. In addition, the students are exposed to design constructs common in the domain. The exposure to the design constructs helps the students build an internal repository of designs which they can draw on when faced with a new design problem in industry.



Bicycle dissection, assembly and testing



Concrete canoe in different stages, jig building, setting, testing and trial



Students building and assembling a radio transmitter

Building on the exposure in the first year, the second- and third-year activities require a bit more design and allow the students to apply the design cycle. In second year, the mechanical electronics engineering students are exposed to lifecycle testing whereas electrical engineering students build a radio transmitter and a digital clock. The lifecycle testing exposes students to data collection, data synthesis, final element modeling, test design, validation, and lifecycle estimation. Similarly, a radio transmitter exposes students to design of oscillators, amplifiers, modulators, inverters, and filters.

The goal in upper years is to expose students to problem solving using a real-world context from an industrial domain of importance to the discipline. Such activities have now been introduced in all programs and include problems such as building a low-cost house (full size), rainwater harvesting, steel structure design, extraction of oil and esters, video game development, neural networks, big data analysis etc. The main outcomes of such activities are to expose students to the design process, domain vocabulary, design constructs and design analytics etc.



Extracting essential oils

Design cycle is universal in engineering. However, applying the design cycle effectively comes with practice. The learning and practice of the design cycle focuses on need identification, specification development [constraints and criteria], conceptual design, detailed design, design analytics and design iteration. To practice the design process and cycle the experiential learning center has developed some specialized projects, including, an autonomous go-kart, autonomous farming, and water purification. The domains are evolving sectors and many students are likely to build their career in these sectors. For those working in domains other than the selected domains the design cycle learning is easily transferable to other domains. Prior exposure to the domain, knowledge of the design cycle, ability to work in teams, practice in effective communication etc. put engineering students ahead of the competition and ready to contribute on the first day of employment.



Engine dissection and assembly



Designing, building, and testing a heat exchanger

All of this has been possible due to a change in approach and thinking of the administration. The visionary approach is to be applauded and should be encouraged with feedback. On a personal note, I am very impressed with the quality of the students at Thapar, their potential and ability to learn fast and apply themselves with rigor. I encourage you all to partake in the growth of Thapar's initiatives whether it is research led by Thapar faculty or by bringing student activities from your respective companies. In enabling future engineers, you will also enable your alma mater.

# Success Story of Team Fateh



Glimpse of Team Fateh

The words resonate loudly. A team working like a well-oiled machine brings results. Working day in and day out, the tiring nights all went out the window when the results came out for the Formula Bharat 2022. Team Fateh was the overall Statics winner and third overall in the competition, a feat never achieved before, a testament to the progress made over the years. But the success did not come easy.

Preparing to enter a competition like Formula Bharat is an extensive process with timelines planned up to a year ahead. But every journey has its ups and downs. The process of designing and manufacturing was a fickle process, but some of the biggest challenges faced by the team came just a few weeks before the competition, with the third wave of covid coming down with full force the news that our esteemed Institute was about to close again. With crucial work still left in the car, it was in the team's best interest to shift the vehicle out of campus to a workshop in Noida. The abrupt decision was best suited to the team but working out logistics in the limited time the team had was a strenuous process. The group shifted to Noida and worked on the car.

After preparing the car to be competition-ready, it was loaded and sent to Coimbatore. When the team and the car reached their destination, the work did not stop. An FSAE competition includes static events and dynamic events. To run a vehicle in a dynamic event, it needs to pass the Technical Requirements (TI). Clearing a TI is no easy feat; the car is scrutinised by individuals who excel in their respective design and engineering fields. The competition spanned across five days with different days dedicated to various events, so the team double-downed to get the car TI ready alongside all the various static events taking place. The competition was five gruelling days of hard work with teams from all over India, but it was all worth it in the end when the results. The team was the overall winner in the static events, placing first in the cost and manufacturing event, second in the engineering design event, and third in the business plan presentation. We placed third overall in the entire competition.

In a whirlwind of events, the competition came to an end. It was a success the team had long-awaited and deserved. Fourteen years of history and more to come, this competition was just a stepping stone towards the future.

# Center of Excellence in Emerging Materials (CEEMS) moves to a New Home

Chair Professor: Prof. R. L. Mahajan

Coordinator: Prof. Rajeev Mehta

We are delighted to share with you a landmark event in the short history of TIET-VT Center of Excellence in Emerging Materials (CEEMS). We have a new home—a newly constructed 7,520 square feet floor on the top of an existing building (SAI) in Avantha Centre for Industrial Research & Development (ACIRD). The floor, which was formally inaugurated on October 21, 2021, houses three state-of-the-art laboratories: Laboratory for Bio-x, Laboratory for Coal-derived Graphene-x, and Laboratory for Composites & Exploratory Research. These are aligned with our research thrust areas and are equipped with some of the key instruments essential to achieving the goals of the research projects undertaken under the thrust areas. In recognition of the critical role played by scientific computation as the third leg of learning and research, the floor also houses a computational and simulation (C&S) laboratory as one of our core capabilities, impacting all the thrust areas. The floor also houses three office spaces, a meeting room, café-x and a spacious lobby.



A seminar in progress in the CEEMS meeting room



# A Collaborative Center of Excellence in Advance Manufacturing

Prof. Millette Shamir, Mr. Gary Sussman, Dr. Emma Afterman and Prof. Noam Eliaz of Tel Aviv University, Israel visited TIET for the inauguration of Center of Excellence for Advanced Manufacturing, and for research collaboration in other areas including digital village.



# Research at TIET

a) The Department of Mechanical Engineering, TIET has received a grant of Rs. 90 Lakhs from DST-FIST for their project entitled, **“FIST Grant on Automation and Robotics”**.

## The objectives are:

- GAIT LAB for motion capture (with integrated high-speed cameras, EMG sensors, force plates, pressure sensors and energy consumption sensors)
- Image-Guided Robotic Arm for Bone Drilling with force sensor Using GAIT Lab equipment, the user will be able to analyse ergonomic human-body motion for the purpose of developing knee exoskeleton, upper and lower body exoskeleton, special shoes for soldiers /sports persons etc. The proposed Semi-autonomous robotic bone grinding/drilling system helps in craniotomy under surgeon’s supervision with higher level of surgical accuracy and efficiency.

b) Thapar Institute of Engineering & Technology signed a comprehensive institutional agreement with Israel’s Tel Aviv University (TAU), covering research, teaching, and student exchange between both institutions. Under this initiative TIET-TAU Center of Excellence for Food Security (T<sup>2</sup>CEFS) has been established. The various cutting edge research projects are undertaken under this Center of Excellence including **Digital Village: A Data-Driven Approach to Precision Agriculture in Small Farms**.

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## DIGITAL VILLAGE PROJECT

TIET-TAU Joint Collaboration Center of Excellence for Food Security

Dr. Moushumi Ghosh (Coordinator)

Dr. Parateek Bhatia

Dr. Karun Verma

Dr. Amit Mishra

Dr. Harpreet Singh

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## DIGITAL VILLAGE PROJECT

TIET-TAU Joint Collaboration Center of Excellence for Food Security

Prof. Yosi Shacham Director (Center of Excellence for Food Security)

Dr. Ram Fishman (Public Policy)

Prof. Eyal Ben-Dor (Department of Geophysics)

Dr. Moushumi Gosh (Coordinator) , Dr. Prateek Bhatia, Dr. Karun Vema, Dr. Amit Mishra, Dr. Harpreet Singh

Prof. Eyal Ben Dor (Department of Geophysics), Dr. Ram Fishman (Public Policy), Prof. Yoshi Shacham (Emeritus School of Electrical Engineering)

Artificial Intelligence-based Digital Village System is a project carried out jointly by Thapar Institute of Engineering and Technology (TIET) and Tel Aviv University, Israel, to carry out extensive research in the field of agriculture and water under TIET-TAU Center of Excellence for Food Security.

c) Prof. Dinesh Goyal of the Department of Biotechnology, Thapar Institute of Engineering and Technology, Patiala, India with his former Ph.D. students, Dr. Nadeem Akhtar, currently working at University of Guelph, Canada, and his current Ph.D. Student Prerna and a postdoctoral researcher Dr. Kumar S Singh from Leibniz University, Germany has contributed to the scientific community with an excellent compilation and edited version of a book entitled “**Emerging Modalities in Mitigation of Antimicrobial Resistance,**” published and released by Springer Nature.

It’s a great contribution to the scientific community in spreading knowledge in mitigating antimicrobial resistance (AMR), which is the deadliest threat to global public health. The book focuses on dynamics in the landscape of growing antimicrobial resistance (AMR) while informing about the latest technologies and strategies to mitigate it. Emphasis is given to emerging technologies that are sustainable, scalable, and applicable to the global community, such as big data analytics, bioactive agents, phage therapy, and nanotechnology. The book has 25 chapters that explores current and alternative treatment strategies to combat AMR, emphasizing the use of nanoparticles to target pathogens and as a viable alternative to antibiotics. The book presents cutting-edge research and next gen technology through the lens of sustainable methods to combat AMR and its an ideal resource for students, researchers, and industry professionals.

The book (ISBN: 978-3-030-84126-3) can be accessed online:

<https://link.springer.com/book/10.1007/978-3-030-84126-3>

d) Our talented team of faculty (Dr. Jaswinder Kaur, Dr. Rajesh Khanna & Dr. Deepti Mittal) has been granted the project to work on **Implantable Cardiac Pacemaker System** using compact bio-compatible antennas. The research focuses on real-time monitoring of various health parameters in patients with heart disease(s) to offer fast diagnosis and efficient treatment.

ANOTHER PROJECT GRANTED TO  
OUR TALENTED FACULTY!

**IMPLANTABLE CARDIAC  
PACEMAKER SYSTEM**

Project granted by  
TIET- Virginia Tech Centre for Excellence in Emerging Materials

**I N N O V A T O R S**

Dr. Jaswinder Kaur  
(Department, ECE)

Dr. Rajesh Khanna  
(Department, ECE)

Dr. Deepti Mittal  
(Department, EIE)

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e) Prof. Tarun Kumar Bera (PI), Prof. Naveen Kwatra (Co-PI), Prof. Shweta Goyal (Co-PI) of TIET has received a grant of Rs. 24.1 Lakhs from La Fondation Dassault Systèmes for their project entitled “**3D Printing of Buildings with Appropriate Concrete Mixes using 6-Axis Robotic Arm**”. The main objectives are to:

- Design, Fabrication of 6-Axis Robot arm for the 3D printing of buildings and design the GRBL controller for precise movement of the arm carrying the nozzle
- Obtaining an optimum mix design of the material which is to be 3D printed for efficient 3D printing of buildings
- Developing topologically interlocked structures that are damage tolerant.

**The outcomes of this research are:**

1. Moving toward more productive, economical and environment friendly 3D printing of buildings.
2. More accurate for using GRBL based controllers for trajectory tracking in a given plan of building.
3. Obtaining an optimum mix design that is compatible with printing technology.
4. Developing topologically interlocked structures that are damage tolerant or higher resistant to fracture propagation.
5. Inclined towards the government of India plans like Industry 4.0 norms, Make in India, Skill India and Atma Nirbhar Bharat Abhiyan.
6. Resource development for research, training and consultancy for nearby institutions and possible tie up from industries for commercialization of developed machines and parts.

f) Design and development of a three-phase **Net Meter** for Vehicle to Grid-enabled charging stations of electric vehicles.

Amrit Pal Kaur and Kratika Yadav, PhD Research scholars, in the EIED department, designed and developed a three-phase Net Meter under the guidance of Dr. Mukesh Singh. The prototype has been developed at Technology Readiness Levels 9 (TRL-9) for vehicle-to-grid (V2G) technology in Electric Vehicle (EV) applications. They have published the findings of their project work in the form of a research article entitled “Design and development of a three-phase Net Meter for V2G enabled charging stations of electric vehicles” in “Sustainable energy, grids and networks”, Vol. 30,2022. This project work was funded by the Department of Science & Technology (DST) and the Department of Heavy Industry (DHI). This net meter complies with the automotive-grade standards and has a specific role in the V2G capability of EVs. The team is working on the technology transfer with the industry.



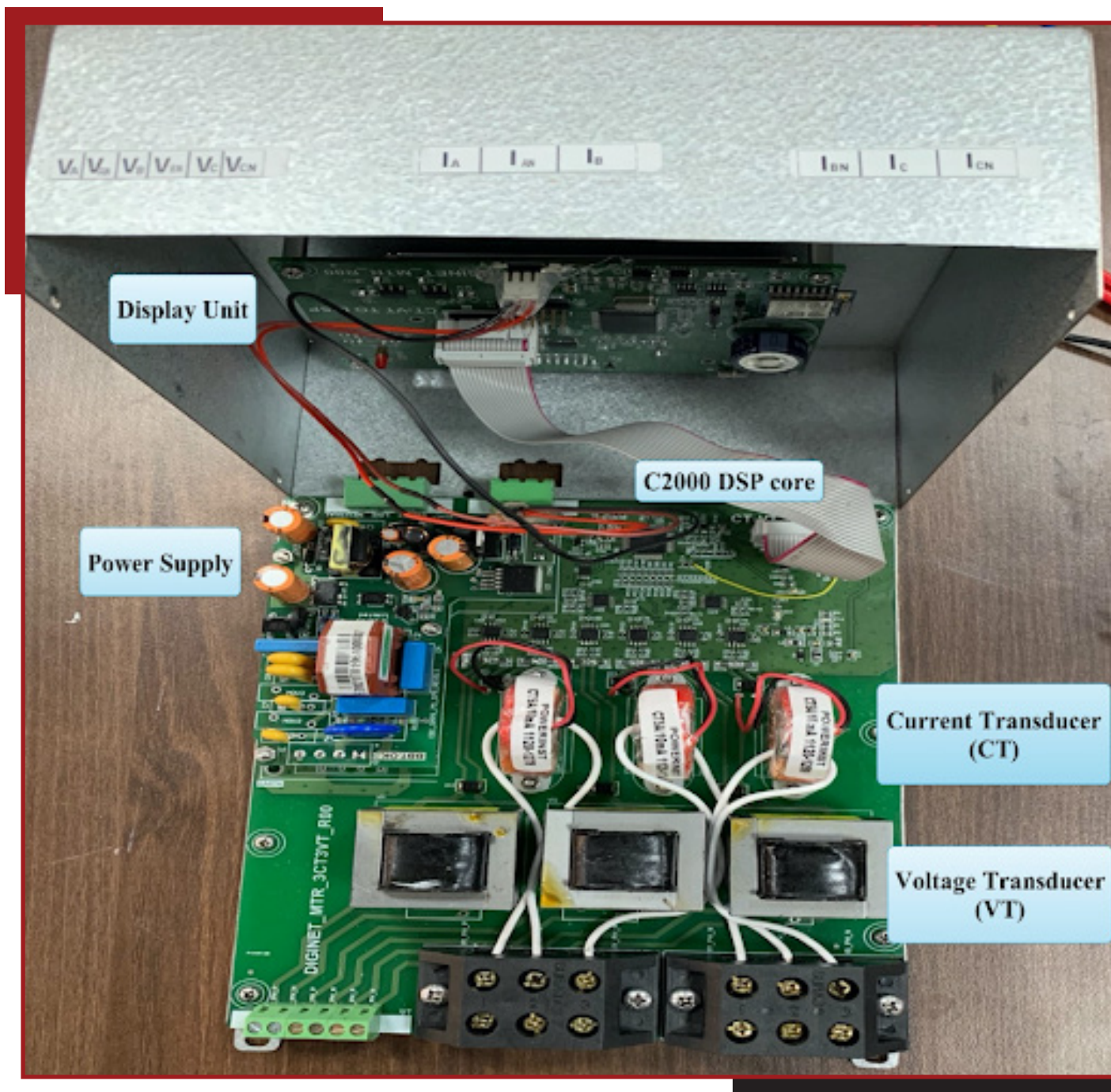
Amrit Pal Kaur  
(Research Scholar)



Kratika Yadav  
(Research Scholar)



Dr. Mukesh Singh  
(Associate Professor)



Developed three-phase Net Meter for V2G technology in EV applications

Findings of the study revealed that the prototype has shown highly acceptable performance in the automotive environment. The prototype is tested with level 1 and 2 chargers to showcase flexibility over a wider bandwidth without any change in the hardware. Also, the device renders IoT support that may support future amendments in EV applications.

g) Indo-Russian Proposal granted from the International division of Department of Science & Technology, Ministry of Science & Technology, Government of India.

**Title of Project: Identification of immunogenic peptide for diagnosis of orthohantavirus infection**



Project Co-ordinator: Dr. Manoj Baranwal, Associate Professor, Department of Biotechnology, TIET, Patiala.

Co-Investigators from TIET: Dr. Priyanka Dey and Dr. Debajyoti Dutta from Department of Biotechnology, Dr. Vinay Kumar and Dr. Rahul Upadhyay from Department of Electronics and Communication Engineering.

Other Co-Investigators: Dr. Sara Chandy, Kanchi Kamakoti Childs Trust Hospital, Chennai and Dr. Rohitha S Chandra, Lisie Hospital, Kochi.

Russian Team Leaders: Dr. Albert A. Rizvanov and Dr. Svetlana F. Khaiboullina from Kazan Federal University, Kazan, Russia.

**Objective of the Project**

1. Immunoinformatic aided design of nucleocapsid and glycoprotein peptide containing immunodominant epitopes against Hantaan (HTNV), Thailand virus (THAIV) and Puumala (PUUV) orthohantaviruses
2. Diagnosis of orthohantavirus infection in patients with acute febrile illness
3. Develop an artificial intelligence algorithm and creation of online resource for epitope analysis for orthohantaviruses
4. Evaluation of peptide specific immune response in human samples
5. Design of peptides (HTNV, THAIV and PUUV) based serological assays to detect multiple serotypes to detect circulating orthohantaviruses

**Expected Outcome of the Project**

Worldwide, Orthohantaviruses infections have increased due to environmental and climatic changes and are a threat to public health. In India, orthohantavirus infections have been largely ignored due to the absence of effective diagnostic tools. This study will help to explore circulating serotypes, develop sensitive diagnostic tools and improve clinician awareness.

h) Dr. Amanpreet Kaur, Assistant Professor, ECED (PI), Dr. Diptiman Choudhury, Assistant Professor, School

of Chemistry and Biochemistry (Co-PI) and Dr. Arnab Pattanayak, Assistant Professor, ECED (Co-PI) have received a project grant from Indian council of Medical research , New Delhi for their project entitled "Design & Development of Microwave-Based Imaging and Hyperthermia Systems, for Diagnosis & Treatment of Skin Cancer Respectively and Testing the Prototype in 2-D and 3-D Organotypic Skin Epithelial Carcinoma Model" The main objective of this project is to develop a microwave based non-invasive, non-ionising diagnosis and treatment system for early-stage skin cancer. The proposed techniques methods may significantly reduce the side effects of conventional cancer diagnosis and treatment therapies such as, chemotherapy and radiation therapy. The validation of the proposed prototype would be done 3-D organotypic culture mimic of the skin tumor model.

i) Dr. Vineet Srivastava and Dr. Ravinder Kumar Duvedi of Mechanical Engineering have received a grant of Rs. 22.15 Lakhs from Dassault Systèmes Foundation for entitled, "Parametric Design of 3D Insole considering Orthopaedic Deformities based on Plantar Pressure and 3D Geometry of the Human Feet".

### **The objectives are:**

- Development of a parametric CAD system to capture modified 3D foot model based on the data collected using plantar pressure and scanned 3D feet profile.
- Developing 3D printed foot-scale and insole mould to capture the shape of corrected foot profile.
- Casting of customized insole to achieve uniform plantar pressure distribution and comfort level in both feet in standing position.
- Developing CAM solution to generate an integrated tool path solution for machining of the insole mould .
- Development of customized modular metallic die for manufacturing of customized Insole.

This research will lead to Customized modular metallic die and 3D printed foot-scale

j) Dr. Diptiman Choudhury, Assistant Professor, SCBC (PI), Dr. Ravinder Duvedi, Associate MED(Co-PI), Dr. Vineet Sivastava, Assistant Professor, MED (Co-PI) in collaboration with Prof. Babita Ghai, Department of Anaesthesia, PGIMER-Chandigarh for human clinical trail have received a project grant from Indian Council of Medical Research , New Delhi for their project entitled "Development of Cross-contamination-free portable suction assembly for airways clearance in mechanically ventilated patients". We as a country have a shortage of hospitals and intensive care units. Further, the facilities in the hospitals are not up to the mark, which increases the chances of hospital borne infections (HIB). Air bourn infections, including TB, pneumonia, COVID-19, etc., are among the most infectious HIB. A significant quantity of aerosol carrying infectious agents is generated during intensive care procedures in the hospital. These aerosols eventually infect the other patients and hospitals' medical and paramedical staff. According to the Indian Medical Associate (IMA) report, more than 1500 doctors and 125 nurses died due to COVID-19 infections until 30th June 2021, and most of them acquired the disease from hospitals or clinics. The situation is so bad that the IMA has declared 'Save the Saviours' as the theme of this year's National Doctors' Day, observed on 1st July. Therefore, an immediate action plan is needed to control the aerosol generation in the hospital environment. Henceforth, to prevent infection of HIB (ICU/ ICCU), we hypothesize developing a low-cost, cross-contamination-free, portable mechanical suction device to remove pulmonary mucosal plugs. The system should be indigenously designed, and the operational procedure should be simple so that one needs minimal training to operate.

### **The expected outcomes are:**

- To develop a portable mechanical suction device at an affordable rate.
- With existing technology, mechanical suctioning of pulmonary fluid generates a considerable amount of aerosol resulting in high risk for HIB. We want to make a device that can prevent cross-contamination by preventing aerosol generation.

- Here we would also like to propose making the device reusable and durable. The collection sack would be easily detachable, contamination-free, storable, and quickly dispatched or destroyed.
- We would also like to commercialize the developed product using a start-up as a medium.

k) Dr. Vikrant Khullar of Mechanical Engineering received a grant of Rs 31.5 Lakhs from DST-SERB for his project entitled "Design, Analysis and On-Sun Testing of High Temperature-Low Flux Photo-Thermal Solar Energy Conversion System".

**The objectives are to:**

- Develop a comprehensive and mechanistic theoretical modeling framework to come up with an optimum receiver design.
- Synthesize/engineer TIMs and THMs with low thermal conductivity.
- Study the effect of process parameters and annealing cycles on the optical, thermo-physical and structural properties of the synthesized/engineered TIMs/THMs.
- Design, development, optimization and indoor testing of the TIMs (and THMs) based volumetric and surface absorption platforms.
- On-sun testing of the optimized receiver design.

And he has developed theoretical and experimental modelling frameworks to assess the performance characteristics of nanofluid/based fluid filled enclosures and receivers (till date).

l) Dr. Anant Kumar Singh of Mechanical Engineering received a grant of Rs. 35.68 Lakhs from DST-SERB for his project entitled "Design and Development of an Improved Multipurpose In-Situ Type Magnetorheological Finishing Process".

**The objectives are:**

- To design and develop a novel improved multipurpose in-situ type magnetorheological (MR) finishing process that would be possible to perform fine finishing using the magnetic tools on a single setup with a common motion control system.
- To study the effect of process parameters with a plan of experiments on the process response such as surface finish improvement using response surface methodology in order to predict the optimum parameters of the proposed process for the fine finishing of the different real-time industrial workpieces.
- To validate the performance of the developed process in fine finishing the different industrial components for improved productivity and cost effective

**The outcomes of this research would be:**

- A state-of-the-art PLC-based multi-axes improved computer-controlled in-situ type magnetorheological (MR) finishing setup along with a confocal chromatic measuring system is to be developed.
- The developed process can be used in a variety of manufacturing industries to achieve many stages of finishing on a single setup while improving productivity, operative functionality, and cost-effectiveness.



# Collaborations

- University of Queensland: Two Programs (2+2 and 3.5+2) have been successfully initiated.
- University of Toledo: 7 Bio-engineering students have transferred to UToledo in September 2021
- The Department of Electronics & Communication Engineering at TIET signed an MoU with Innavior Technologies Pvt. Ltd. for leading capstone projects.



## Center for Academic Practices and Student Learning (CAPSL)

### 6-10 September 2021:

New Direction Program during 6-10 Sept 2021 (First Session), 11-14 Oct 2021 (Second Session) and 7-11 March 2022 (Third Session) were Conducted for batch 6 participants.

### 11-14 October 2021:

72 Newly joined faculty Participated in these programs.

### Core Modules:

5 Core Modules (Student Centric Learning, Reflection, Curriculum, Outcome based Approach and Assessment) were offered.

### **Fellow Optionals:**

5 Fellow Optional Modules (Peer Observation Teaching, Project based Learning, Research Integrated Teaching, Fostering Self regulated Learning and Effective design and use of rubrics for feedback and assessment were offered

### **CAPSL Optional:**

Creativity, Group work and Evaluated Teaching were offered as CAPSL Optional modules. Participants have to attend at least 2 Fellow Optional Modules and 2 CAPSL optional modules.

### **ADP Program:**

47 Faculty from all Departments and Schools of various cadres successfully completed Advanced Program (ADP Batch II) during Nov 2021.



## **Students' Achievements:**

### **a) Development of an Electric Vehicle cart from a scrap vehicle:**

UG students of the EIED department have developed an EV cart, an 8 seater from a scrap vehicle under the supervision of Dr. Mukesh Singh, Associate Professor. The lithium-ion battery installed in the cart covers 30 km in one charge and the maximum speed attained is 25km/h. This cart runs on a BLDC motor of 2.5 kW which has sufficient power and torque to drive inside the TIET campus.



## b) Thaparians developed an App for Barnala City:

Thaparians developed an app for the Barnala police for the surveillance purpose during the elections of 2022. The app (PP-VIGIL) focused on the collection of data for the elections (Vidhan Sabha 2022, Punjab). In the application, they integrated Google Maps to track the location of hotspot areas. For its innovation, the team received a cash prize along with certificates from IPS IGP Patiala range. We wish them good luck and hope they always reach the greatest heights and keep working hard. The team members are- Jatin Goyal, Pratham Verma, Vishesh Goyal, Nitish Garg and Kashin Gupta.



## c) Best Project Award 2021, PhD Category:

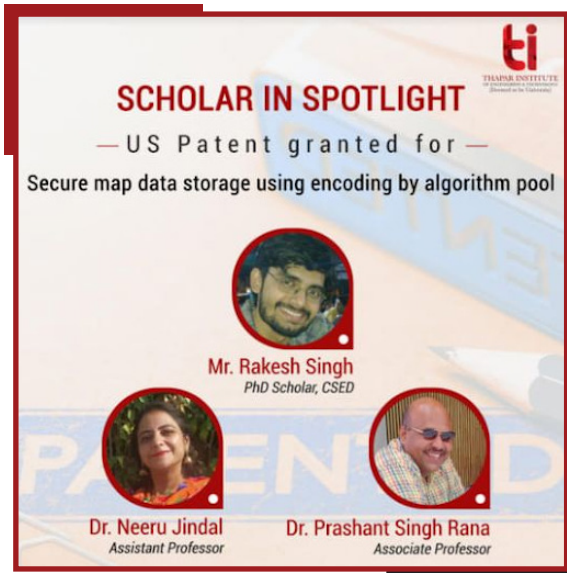
Dr. Aarti Bansal was awarded the ComSoc Best Project Award-2021. Pushing ahead and trying new tips and tricks under the supervision of Dr. Surbhi Sharma, Associate Professor, ECED and Dr. Rajesh Khanna, Professor, ECED. She has achieved a grand success to whole Thaparians.



## d) Best Project Award 2021, Computer Science Engineering:

Sukhbir Singh, Ayush Pushkarna and Balkar Singh from Computer Science and Engineering Department were awarded for their outstanding project work on "Lil'Learn" under B.Tech category by IEEE ComSoc under the guidance of Dr. Prashant Singh Rana and Mrs Swati Kumari.



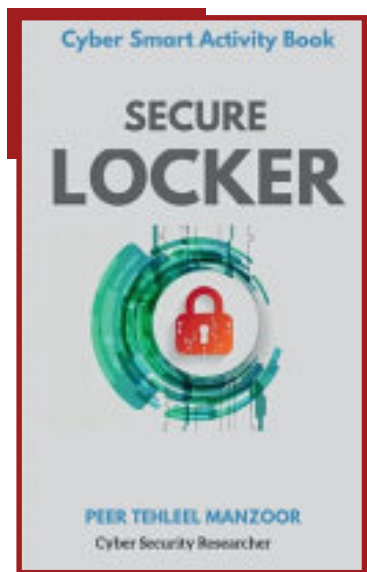


**e) US Patent granted to Mr Rakesh Singh, PhD Scholar:**

Mr Rakesh Singh, PhD Scholar granted US Patent under the supervision of Dr. Prashant Singh Rana, Associate Professor and Dr. Neeru Jindal, Assistant Professor.

**f) Ms Gurleen Kaur has been shortlisted for the Idea Stage- Round 2 of ROAR, Punjab’s Biggest Idea Hunt:**

With her passion and commitment to innovate, our research scholar, Ms Gurleen Kaur has been shortlisted for the Idea Stage- Round 2 of ROAR, Punjab’s Biggest Idea Hunt. Her idea was based on her doctoral research. Her mentor is Prof. Sanjai Saxena, for the challenge program.



**g) Peer Tehleel Manzoor (1st year of Master degree in Computer science Engineering) published a book:**

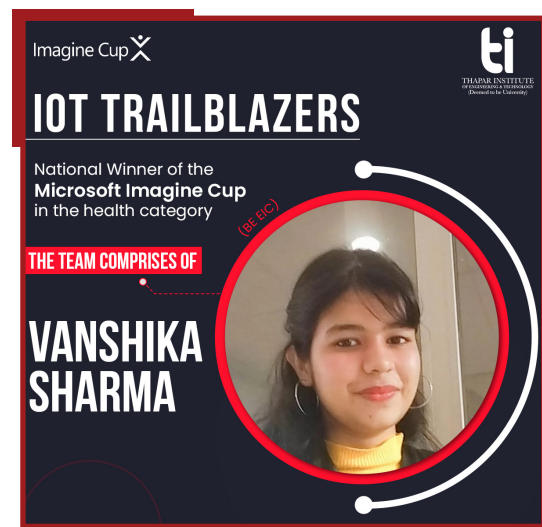
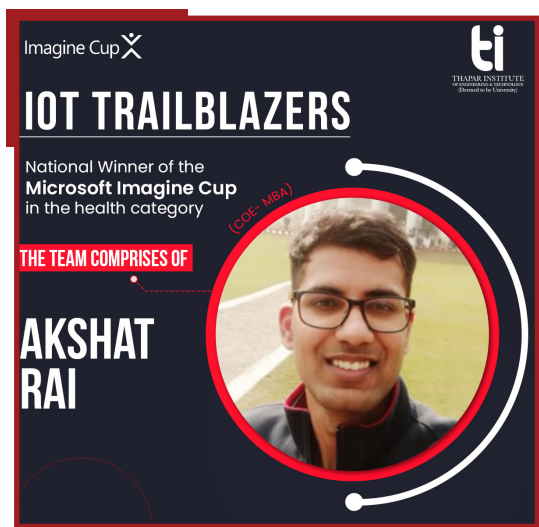
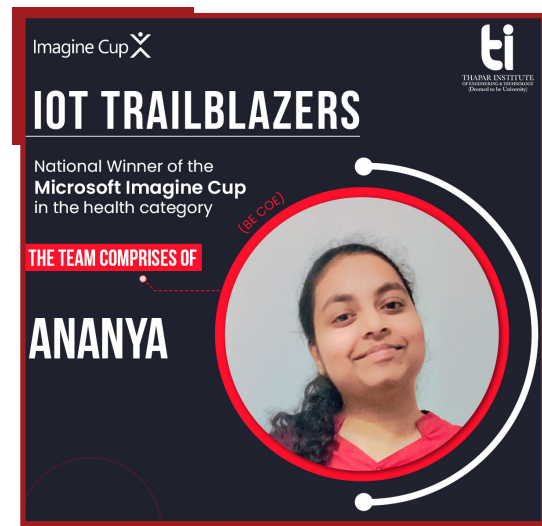
The book deals with the kind of trouble children can get into when they are online, and suggests simple yet effective ways to deal with such situations. This book is a must-read for every parent, teacher or child who wants to avoid the temptations and perils of cyberspace.

## h) Ritwik Mehta, founder of NITI TANTRA Pvt.Ltd:

Ritwik Mehta (Electrical Engineering, Batch-2022) is founder of NITI TANTRA Pvt. Ltd, which is a policy-think tank startup in September 2021. Niti Tantra provides an unbiased analysis of National and International Economic Policies, Law and Governance policies, and analysis of Election Manifestos. Niti Tantra was featured by the media recently. In the field of cryptocurrency and blockchain, Niti tantra and Fintech & Blockchain Association of India established a body FAB-TANTRA to review the IT-related laws. The aim is to launch courses in the field of public policy and political research by the end of this year. The research papers and blogs can be found on the website. (<https://nitantra.com/>)

## i) IOT Trailblazers:

A tremendous achievement for 'IoT Trailblazers' who participated with teams from all over India in multiple rounds and made it to the finale, emerging as the national winner of the Microsoft Imagine Cup in the health category. Imagine Cup is an annual competition sponsored and hosted by Microsoft Corp., bringing together student developers worldwide to help resolve some of the world's toughest challenges. The team also won a 'Surface Go' each and a Mentorship session by Mr. Arvind Upadhyay (CEO- 8chili Inc).



**j) Team Rana bagged the first position at the Manthan 2021 Hackathon and wins a cash prize of Rs. 1 Lakh:**

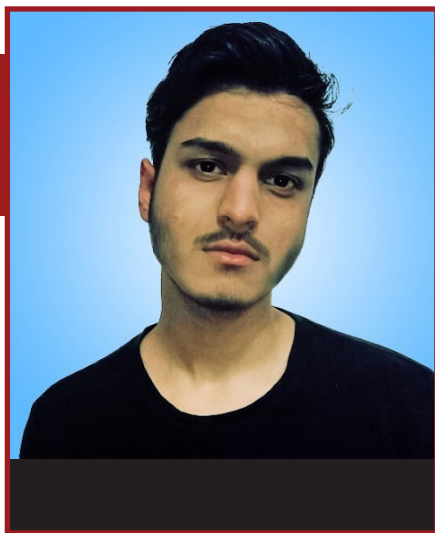
Another outstanding achievement by our #EngineeringAchievers.

Team Rana bagged the first position at the Manthan 2021 Hackathon and wins a cash prize of Rs. 1 Lakh. Competing against 2300+ teams at the initial stage and 115 teams in the grand finale, our Thaparians, under the guidance of Dr. Prashant Singh Rana, emerged victorious.



**k) TIET students of UG 2nd year participated in HackPrinceton 2021:**

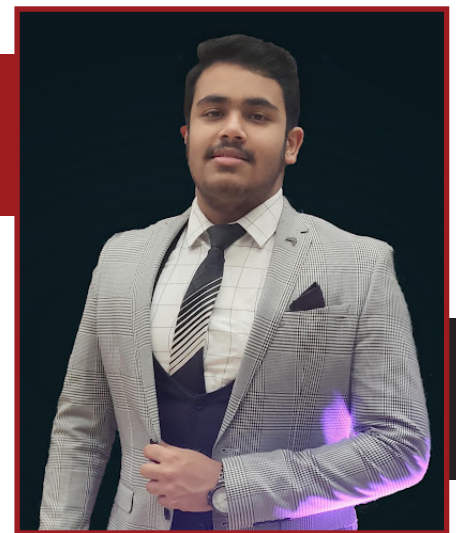
A team of Prabhav Chopra, Shivam Dargan, Abhimanyu Raghuvanshi (UG 2nd year COBS branch) participated in HackPrinceton 2021, which was held on 5 - 7th November 2021. HackPrinceton is a global 36-hour hackathon organized by Princeton University, USA annually with approximately 600 participants after shortlisting, from all around the world and has very high merit among the technical community. The team was placed first in overall category globally and also won a sponsor prize - Reinventing Social Network By Neo. The team created "Nayak" which is a community platform (website) for people to raise their issues in the form of tickets. One can then share the tickets with the community to gain support. The community can view and upvote the tickets raised in their Proximity to show their support for the issue. All tickets are ranked on the main feed based on the upvotes, more upvotes are equal to more pressing and urgent problems. The authorities then, can view the ordered list of most pressing issues and take action on those issues accordingly making the whole process effective and efficient.



Abhimanyu Raghuvanshi



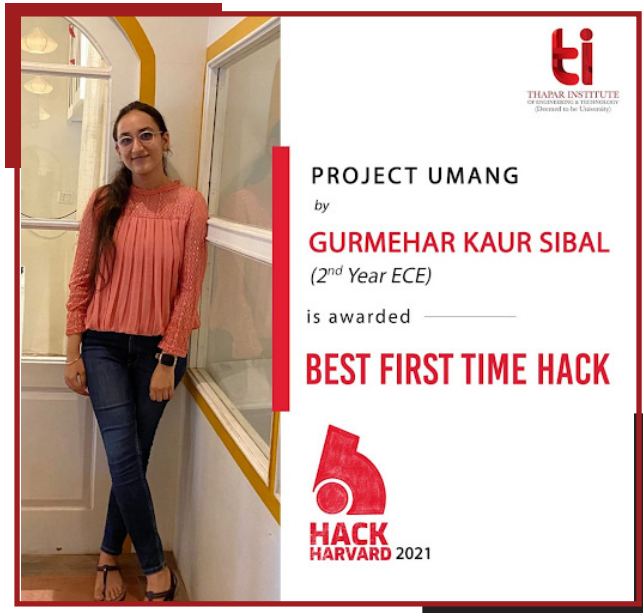
Prabhav Chopra



Shivam Dargan

### **I) An enlightening session with Dr S Jaishankar:**

Ms Roohi Chaudhary, a student at Tel-Aviv University under Thapar Institute's International Engineering Programme met with Dr. S Jaishankar, External Affairs Minister, Government of India in Israel



### **m) Thaparian Gurmehar Kaur Sibal and her team developed a platform 'Umang- Your Interactive Self-Transformation Journey':**

Amidst the hectic lives and pandemic struck world, mental health has taken a back seat. Realising the need for better self-awareness, Thaparian Gurmehar Kaur Sibal and her team developed a platform 'Umang- Your Interactive Self-Transformation Journey'. The project uses facial recognition technology to analyse moods,curate mood based playlist ,recommend and evaluate yoga poses, and maintain a self-care journal.

### **n) Team Trinity secures first position at Ernst & Young GDS Hackathon:**

Team Trinity has brought great laurels to the institute by securing the first position at Ernst & Young GDS Hackathon this year. The participants were- Kritika Ahuja, Saksham Gupta and Shiva Thavani.



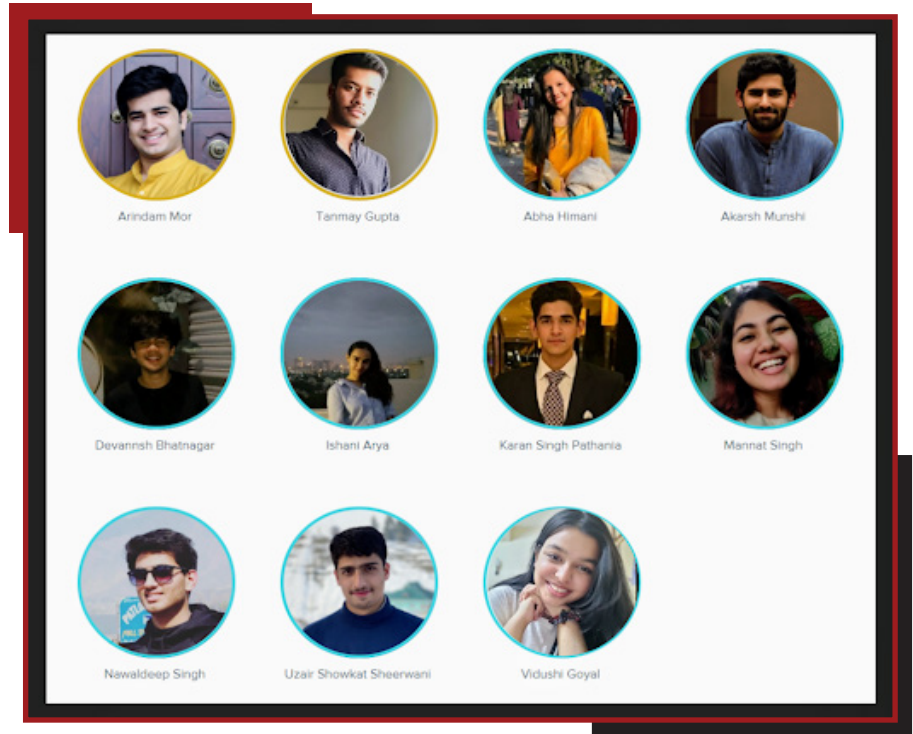
## o) Recognition of TIET students by United Nations Academic Impact (UNAI)

The United Nations Academic Impact (UNAI) and Millennium Campus Network (MCN) unveiled the Millennium Fellows of 2021. With over 25,500 applicants from over 2,200 campuses across 153 nations and 120+ campuses worldwide (just 6%) have been selected to host 2000+ Millennium Fellows (only 8%) in 2021. 11 Fellows of Thapar Institute were among the Millennium Fellowship recipients. Of these 11 Fellows, two were honored with the additional charge of a Campus Director. The Campus Directors lead the cohort and act as a bridge between the university and MCN.

The Millennium Fellowship is a semester-long leadership development program on the campus to help take your social impact to the next level. It provides access to world-class training, connections, and recognition. Millennium Fellows are selected from a range of academic institutions - large and small, public and private - affirming the fact that there are student leaders in every community committed to localizing the SDGs and strengthening communities.

### Thapar Institute of Engineering and Technology's cohort members for 2021-

1. Arindam Mor (Campus Director)
2. Tanmay Gupta (Campus Director)
3. Abha Himani
4. Akarsh Munshi
5. Devannsh Bhatnagar
6. Ishani Arya
7. Karan Singh Pathania
8. Mannat Singh
9. Nawaldeep Singh
10. Uzair Showkat Sheerwani
11. Vidushi Goyal



TIET students recognised by United Nations Academic Impact (UNAI)



# Faculty Achievements

a) **Prof. Neeraj Kumar** of Thapar Institute was ranked in the prestigious **Research.com**, one of the major websites for Computer Science.

b) **Prof. Sanjai Saxena and Prof. Piyush Verma**, initiated the first faculty startup **AGPHARM BIOINNOVATIONS LLP** that adds another feather to its cap. Atal Innovation Mission (AIM) features the startup in the coffee table book 'Agriculture and Allied Sectors', released on 29th Dec. 2021.

**A GRANDIOSE MOMENT FOR ALL THAPARIANS!**  
**8<sup>th</sup> EDITION OF TOP COMPUTER SCIENCE SCIENTISTS IN INDIA**  
**Research.com**

**PROF. NEERAJ KUMAR**  
 Department of Computer Science and Engineering

H-INDEX	CITATIONS	WORLD RANKING	NATIONAL RANKING
85	20,765	337	337

**AGPHARM BIOINNOVATIONS**

**FIRST FACULTY STARTUP**  
 gets featured in the Coffee table book  
 at ATAL INNOVATION MISSION

**Agriculture and Allied Sectors**  
 INNOVATIONS FOR YOU

c) Our distinguished faculty was mentioned in the '**top 2% scientists with single-year impact**' by Stanford University.

**Dr. Harish Garg**  
 Assistant Professor, School of Mathematics  
 Scientific Field: Artificial Intelligence & Image Processing

**Dr. Rafat Siddique**  
 Senior Professor, Department of Civil Engineering  
 Scientific Field: Building & Construction

**Dr. Neeraj Kumar**  
 Professor, Department of Computer Science and Engineering  
 Scientific Field: Networking & Telecommunications

**Dr. O.P. Pandey**  
 Senior Professor, School of Physics and Materials Science  
 Scientific Field: Materials

**Dr. Soumen Basu**  
 Associate Professor, School of Chemistry and Biochemistry  
 Scientific Field: Chemical Physics

**Dr. Jai Prakash Kushwaha**  
 Associate Professor, Department of Chemical Engineering  
 Scientific Field: Chemical Engineering

**Dr. Sahaj Saxena**  
 Assistant Professor, Department of Electrical and Instrumentation Engineering  
 Scientific Field: Networking and Telecommunications

**Dr. M. S. Reddy**  
 Professor, Department of Biotechnology  
 Scientific Field: Biotechnology

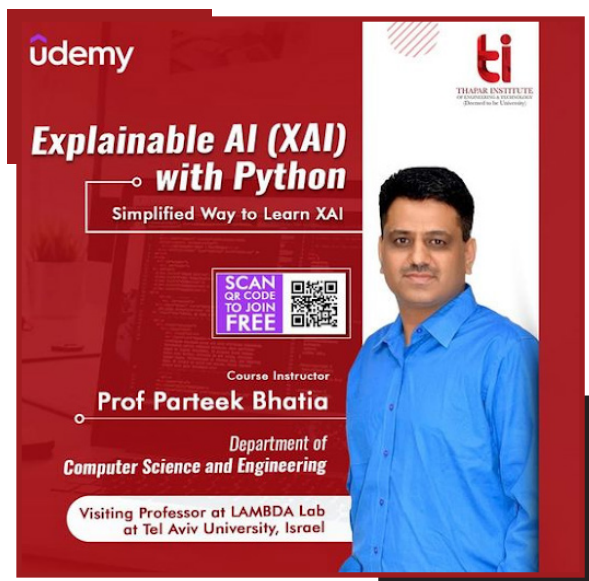


d) Another proud moment for all Thaparians as the startup **BulkSolid Innovation India**, founded by **Dr. S.S. Mallick, Dr. Kundan Lal and Dr. Atul Sharma** were granted a gigantic amount of ₹7 Lakh by the Ministry of Electronics and Information Technology. We are elated for such technological solutions that address the various societal challenges and make a difference in the world.

e) TIET incubated startup Thinkwave Technologies LLP granted with a whopping amount of 7 Lakh from MeitY, Govt. of India. Grateful to our eminent researchers for endorsing **THINKWAVE TECHNOLOGIES LLP** and continuously thriving towards excellence.



f) **Prof. Parteek Bhatia** has curated an array of courses on UdeMy, one of the largest online education platforms.



g) **Dr. Gaurav Goel**, Assistant Professor gets recognized as Co-convenor Leading innovation and research in Mechanical Engineering! Congratulations to Dr. Gaurav Goel for the certificate and exceptional research support during the ITME2021's Session 15. The conference was organized by KIET Group of Institutions in collaboration with the London South Bank University, United Kingdom.



#### h) **Poems of Dr. Parteek Bhatia-**

Dr. Prateek Bhatia, Associate Professor, Computer Science Engineering Department, TIET composed various enlightening poems on different current topics.

We are amazed and touched by his creativity at par. You can read more of his classics on the following links:

<https://www.facebook.com/officialTIET/videos/dr-parteeek-bhatia-professor-in-the-department-of-computer-science-and-engineerin/664241078180165/>

<https://www.facebook.com/officialTIET/videos/hindi-poem-nanak/1284159831785477/>

<https://www.facebook.com/officialTIET/videos/poem-on-pollution-by-prateek/1399710863541383/>



i) **Dr. Moushumi Ghosh**, Professor, Department of Biotechnology was recognised as Honorary Author by London Journals Press.

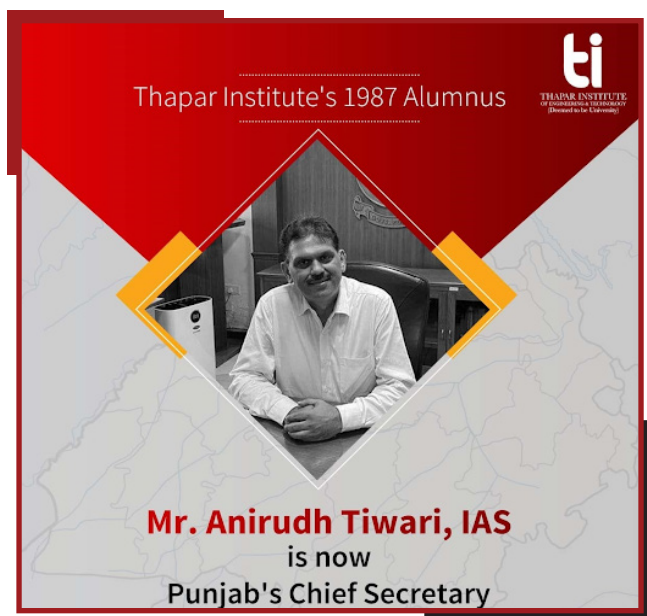
## Alumni Achievement

### Mr. Anirudh Tiwari

Alumni Mr Anirudh Tiwari is presently working as the Chief Secretary to the Government of Punjab, India. He has wide policy experience of working at the state and national level, with more than 30 years in the Indian Administrative Service (IAS).

### Ish Ahuja (Civil Engineering Batch 2007)

Ish Ahuja has indeed made us proud with his new designation as Director - Project Planning and Controls of ARCH Artifex. He has around 15 years of experience in the construction industry, establishing, implementing, and maintaining the Project Planning and Controls framework across the project lifecycle.



## Shalini Chhabra (Electrical Engineering Batch)

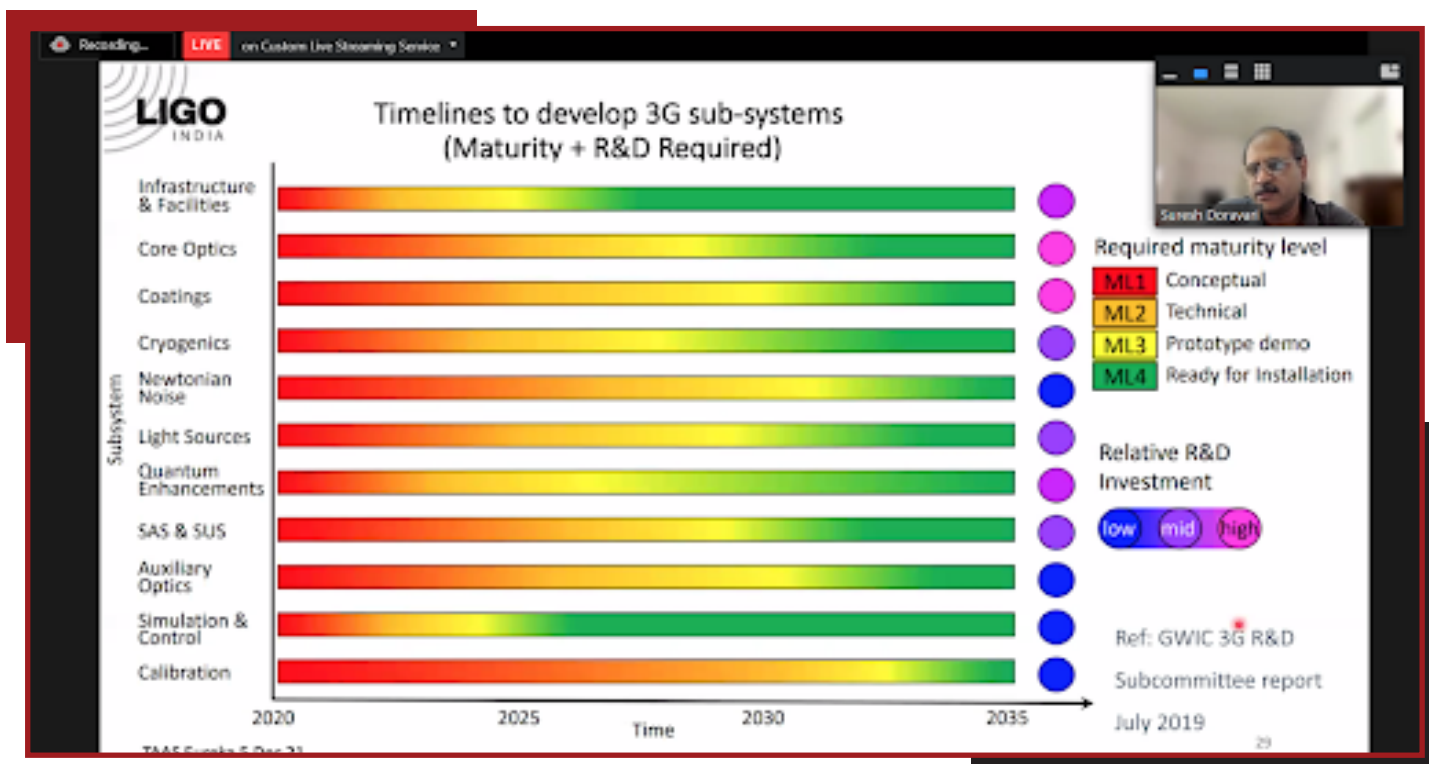
Kudos to Shalini Chhabra for getting her book 'Dear Silver Lining: A collection of odd yet awed odes' nominated at the prestigious PVLF Excellence Awards.



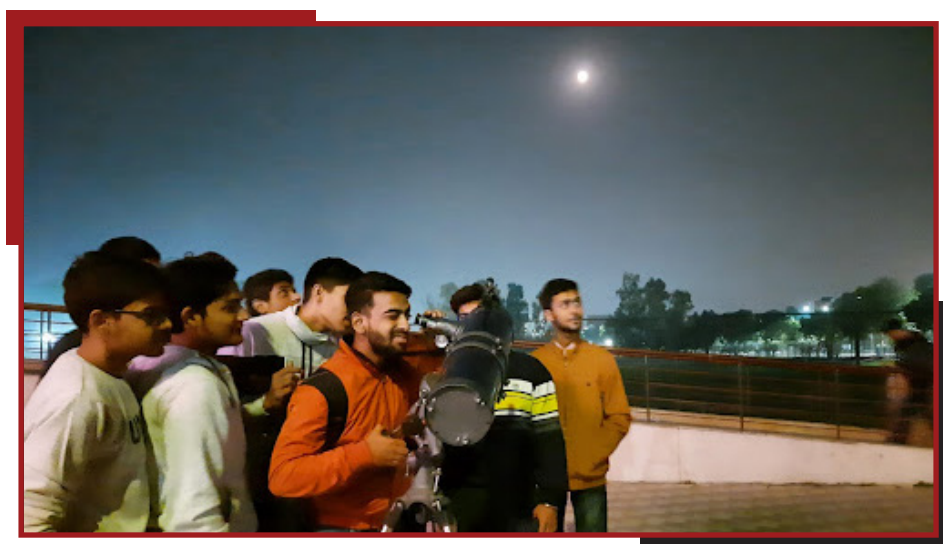
## Events at TIET

### a) Annual Lecture Symposium Eureka 5.0

Thapar Amateur Astronomers Society (TAAS), an organization founded on the ideals of curiosity, science and the pursuit of knowledge, strives to empower the student populace by arming them with knowledge, encouraging them to think critically and question the facts that everyone unthinkingly swallows without due diligence. It is with these goals in mind that we conducted one of our flagship events of the year, Eureka 5.0. Primarily a lecture symposium which invites lead professors in their chosen fields to further expand on their topic of interest, our theme this time was Gravitational Waves, one of Einstein's most terrific, marvelous predictions. Taken up by Dr. Bala Iyer and Dr. Suresh Doravari, they influenced the young minds to think beyond the obvious, beyond the realms of science fiction to the secretive places in the universe, taking a practical approach for research and technological innovations opportunities with an introduction to advanced LIGO. Future scope of gravitational waves for astronomy and engineering students was also discussed. A panel discussion helped make the whole event a lot more approachable.



A glimpse of our Lecture Symposium as it was aired live



Students taking a peek through the telescope



A glimpse of the moon on setup Day 1

## b) Digital Village Hackathon

At Digital Village Hackathon, students had the opportunity to work on challenges faced in the field of precision agriculture and use various technologies in the domain of machine learning, deep learning, computer vision, data science, etc., to create world-class solutions that will have practical applications in agriculture.



Department of Computer Science and Engineering is conducting

THAPAR INSTITUTE  
OF TECHNOLOGICAL EDUCATION  
(Deemed to be University)

INTERNATIONAL  
**DIGITAL VILLAGE**  
HACKATHON

Project: **Digital Village: A Data-Driven Approach to Precision Agriculture in Small Farms**

19<sup>th</sup> to 20<sup>th</sup> March

A joint initiative of TIET-TAU Center of Excellence for Food Security (T<sup>2</sup>CEFS)

Collaborators

ti | THAPAR INSTITUTE OF TECHNOLOGICAL EDUCATION  
+ | TILAKJI TOPOGONDIA UNIVERSITY  
SILENT STARTUP | STEPTIET | Google GIG TIET Industry

Partners

polygon | Tezos | Celso | Filecoin

## c) An Expert talk by Mr Sudipto Ranjan Dass

Department of Chemical Engineering, Thapar Institute organized an insightful session by Mr Sudipto Ranjan Dass from UNO Minda, who talked about lead acid batteries.



AN EXPERT TALK BY

THAPAR INSTITUTE  
OF TECHNOLOGICAL EDUCATION  
(Deemed to be University)



MR. SUDIPTO RANJAN DASS

UNO MINDA

Topic "AN EYE OPENER ON LEAD ACID BATTERIES"

#### d) Workshop on Standardisation of sensors, devices and their applications

Electrical & Instrumentation Engineering organized a two days workshop on Standards in Sensors, Devices, and their Applications on 22nd-23rd February 2022 in hybrid mode in association with CSIR-NPL under the umbrella of the Metrology Society of India.



#### e) International webinar on Corrosion of steel in reinforced concrete

Department of Civil Engineering hosted an International Webinar on Corrosion of Steel in Reinforced Concrete graced by Dr. George Sergi, Technical Director at Vector Corrosion Technologies, UK, and Dr. Homayoon, leading an Atkins team specialising in Forensic Investigation at UK.





## f) Thapar Institute celebrated National Cadet Corps (NCC) Day

The celebration took place in the esteemed presence of Director Dr. Prakash Gopalan, Dr. Gurbinder Singh and Capt. Manjit Singh. We select 18 B.Tech students each as cadets for Army and Air Wings every year, who can attempt the B and C Certificate Exams.



## g) Interaction with Mr. Victor A Finch

Students at Thapar Institute had an insightful interaction with Mr. Victor A Finch, Director of International Admissions, University of Toledo on 29th October 2021.



## i) Capstone 2.0

Workshop was successfully conducted by Prof Sanjeev Bedi, University of Waterloo, Canada. The workshop was attended by 35 fully members from all the departments.



## j) NAAC sponsored National workshop

IQAC of Thapar Institute of Engineering and Technology Patiala organised two days NAAC sponsored National workshop on "A Paradigm shift from Content based to Outcome based Education" during 26-27th August, 2021. There are 196 participants registered from 20 different states of India. This workshop started with an introductory remarks by Prof. Ajay Batish, Deputy Director and IQAC coordinator and subsequently Prof. Prakash Gopalan Director, TIET introduced the chief guest Prof. Anil Sahasrabudhe, AICTE chairman. The workshop was inaugurated by AICTE chairman Prof. Anil Sahasrabudhe. In his inaugural speech, he appreciated the initiation taken by Thapar Institute to organise the workshop on outcome based education for the faculty of AICTE sponsored institutes. He emphasized on various attributes a graduate must have which should be the commitment of an institute by establishing the vision statement and its attainment through certain goals.



# Thapar Institute Counselling Cell (TICC)

The Starry Night

***"Art enables us to find ourselves and lose ourselves at the same time."***

Thapar Institute Counselling Cell (TICC) organized and conducted an online event on Art Therapy from 13th-15th August, 2021. The event Starry Night was all about expressing oneself with the help of some art form. It dealt with three significant topics, Happiness and Gratitude, Portrait and Self, and Relaxation. Happiness is acceptance, self-love allows one to express themselves in a unique way, and relaxation is the best treatment for the mind and body. The participants showcased their emotions in the form of photographs and paintings that are therapeutic and remind them of beautiful things in life.

Borderline Personality Disorder Screening Test:

***"You, yourself, as much as anybody in the entire universe, deserve your love and affection."***

Borderline personality disorder is a mental health condition that involves difficulty in managing emotions and behaviour, results in self-image issues, and a pattern of unstable relationships. TICC conducted a borderline personality disorder screening test from 16th-17th September, 2021 to help those who might need it. It included diverse activities such as:

- Questionnaires were handed to the volunteers.
- The responses were analyzed by the TICC Mental Health Student Ambassadors of MA Psychology from second year, also under the guidance of Dr. Sonam Dullat (Professional Student Counsellor) and Ms Garima Garg (Assistant Student Counsellor).
- Participants with high BPD scores were called for a counselling session.
- With treatment, it appears that many people with the disorder eventually can take some pleasure in their relationships and have satisfying life achievements.

World Mental Health Day, 2021:

***"Know that deep inside, you are resilient, brave and so much stronger than all your fears! You have the competence to fight the most arduous impediments, even if it means dealing with Mental Health issues in an unequal world!"***

The World is muted about all those people who suffer from mental health difficulties and do not receive the treatment that they are entitled to. They along with their families continue to experience stigma and discrimination with no voices raised up for their egalitarianism which brings along a dire need to stand up for all such communities. Therefore, 10th October, 2021 was all dedicated to talking about "Mental Health in an Unequal World" and knocking off the blemishes that revolve around Mental Health. The team of TICC came together with one accord, one voice, and one beat, to build back better, fairer mental health services for all.

Video message on World Mental Health Day, 2021 was presented by our Hon'ble Director Prof. Prakash Gopalan, respected Dean, Student Affairs, Dr. Indervere Chana, Professional Student Counsellor, Dr. Sonam Dullat, Assistant Student Counsellor, Ms Garima Garg, and the Mental Health Student Ambassadors at TICC. World Mental Health Day 2021: <https://youtu.be/FDFPYxR28PY>

# Centre for Training and Development

The Centre for Training & Development (CTD), introduced a few initiatives apart from its regular placement training & counseling interventions. Details of these are as follows:

- Campus to Corporate: The Centre launched an integrated learning program to address the training needs of students preparing for campus placements/competitive examinations. The program shares relevant content with the registered students covering the following, on all 07 days of the week:
- General Management & Communication Skill
- Aptitude Skills
- Placement Readiness
- Professional Readiness

The program, delivered through the Telegram App, commenced on January 17, and has a registration base of over 2200 students.

- Insta-Prep: The Centre launched a program to help the students, the millennial way! To brim up the students to 'factfulness,' the Centre posts the following through its social media handle @Instagram 'ctd\_tiet,' which currently has over 2200 followers:
  - a) Monday Motivation: To leverage the wisdom of people from different fields & areas, we post a short video clip spanning across 30 seconds to 01 minute.
  - b) Testing Tuesday: To provide insights on strategic intent/vision/mission of select companies visiting TIET campus for placement, we share a 04 question quiz, leading to a corporate connect.
- Placement Preparator: To provide insights on the selection process of select companies visiting TIET campus for placement, we broadcast select placement-related FAQs - Online Test, Technical Interview, HR Interview with their solutions/recommended answers.
- Do's & Dont's: To prepare students for specific employability-related challenges, we circulate tips on handling/managing the plethora of challenges during interviews & group/case discussions.
- News of the week: To help students analyze and interpret current affairs, we publish a weekly dissection of national/international news.
- The Chithi: In line with the wisdom in the quote: "Whether your audience is an inquisitive panel, a group of receptive colleagues, or a team of strict regulators, your job is to influence them certainly, and this requires careful planning of your content and delivery," the Centre equips students with persuasive and contemporary content, with the following features:
  - a) Selective brand stories/business news
  - b) One mail - one story per week
  - c) One time e-registration
  - d) 'Chitthi Aai Haih' - every TuesdayThe Chithi currently has 710 subscribers.

Note: CTD is also actively offering programs for resume support, international admissions, interview preparation, career counseling & skill-building in specific domains.

