



# Youth Conclave 2022

(INAE – SERB Youth Conclave On Technology Self-Reliance)

Organized by IIT Jodhpur in association with INAE

(15 – 18 September, 2022)



**Emerging Technologies for Sustainable Future**

TECHNOLOGY SELF-RELIANCE

प्रौद्योगिकीय आत्मनिर्भरता

## ADVISORY COMMITTEE



**Prof. Santanu Chaudhury**

Director

Indian Institute of Technology, Jodhpur



**Prof. Purnendu Ghosh**

Executive Director, Birla Institute of Scientific  
Research

Vice President, INAE



**Prof. Souvik Bhattacharyya**

Vice Chancellor

Birla Institute of Technology and Science, Pilani



**Prof. Bijnan Bandyopadhyay**

Visiting Professor

Dept of Electrical engineering, IITJ



**Prof. B. P. Kashyap**

Visiting Professor & Head

Dept of Metallurgical & Material Engineering, IITJ



**Prof. P.K. Tewari**

Visiting Professor & Head

Dept of Chemical Engineering, IITJ



**Prof. C. Venkatesan**

Visiting Professor

Dept of Mechanical Engineering, IITJ

Organizing Committees



॥ त्वं ज्ञानमयो विज्ञानमयोऽसि ॥

# Youth Conclave 2022



IIT Jodhpur organised Youth Conclave 2022 in collaboration with Indian National Academy of Engineering (INAE) and SERB at IIT Jodhpur campus from 15 Sept. to 18 Sept, 2022.

Youth conclave is an annual event promoted by INAE. The purpose of the event is to provide a platform to the country's youth to express their technological creativity and ingenuity, and demonstrate their ability to innovate towards finding solutions that impact our collective future. In addition, participating in this event provides an excellent platform for students to interact with fellows of INAE and experts who have distinguished themselves with contributions in Engineering R&D, Industry and Academia. The theme of this fifth edition of Youth Conclave-2022 was: **“Emerging Technologies for Sustainable Future”**.

The specific focus areas identified to anchor the Conclave were as follows, with each area being helmed by a faculty conveners from IIT Jodhpur:

- Quantum Technologies (Convener: Prof V Narayanan)
- Smart Infrastructure (Convener: Dr Ranju Mohan)
- Digital Healthcare (Convener: Dr Sushmita Jha)
- Materials for Sustainability (Convener: Dr Ravi K R)
- Experiential Interface (Convener: Dr Amit Bhardwaj)
- Sustainability of Drinking Water (Convener: Dr Anand Plapally)
- Food: An Emerging Vista of Engineering (Convener: Prof Mitali Mukerji)

Apart from the Technical Sessions which involved Invited talks and Paper / Poster presentations in the above identified focus areas, several other events like Hackathon, Ideathon, Game Jam, Start-up Show Case, and 3-Minutes Thesis Presentation were conceptualized, planned and implemented.

The participation in each event was by nomination of the individual students (Technical Paper and 3 Minute Thesis Presentation) and student groups of 3 – 5 members (for Hackathon, Ideathon and Game Jam) by the Head of respective institutions who accepted our invitation to participate in the Youth Conclave. Shortlisting for each event was done based on evaluation of the preliminary submissions made by aspirants and final invitations were sent to the shortlisted individuals / teams. During the Conclave, final rounds of each of the five competitions were held. Awards were presented to the winning individuals / teams during the Valedictory session on the 18<sup>th</sup> of September, 2022. In addition, all the participating students were provided a Certificate of Participation.



The event was executed by the student body at IIT Jodhpur under the overall guidance of Professor Santanu Chaudhury (Director IIT Jodhpur), the Patron of the Youth Conclave. With direction from Prof C Venkatesan the faculty-in-charge of the event, various faculty conveners along with Dr Sankalp Pratap (FIC – TISC and President – Board of Innovation & Entrepreneurship) coordinated the organising effort. The consistent



promotion of the event, executed by a group of over 100 IIT J students, involved phone calls, e-mails, visit to institutions, posts on LinkedIn and Instagram among others. Nearly two weeks of such effort attracted registration from over 2000 students across the country with 75% of aspirants being from institutions other than IIT Jodhpur. Application for participation were received from 149 institutions including 16 IITs and 13 NITs. Infrastructural constraints (number of hostel rooms available) compelled the organizing team

to finally invite 322 students from 50 institutions and 361 students from IIT J to participate in the competitions (refer graphs on page 5).

Highlighted on the collage above is the student team which worked relentlessly to make this event a grand success, first by attracting students from other institutes to IIT J campus and subsequently by coordinating the Youth Conclave and its competitions in a meaningful manner.

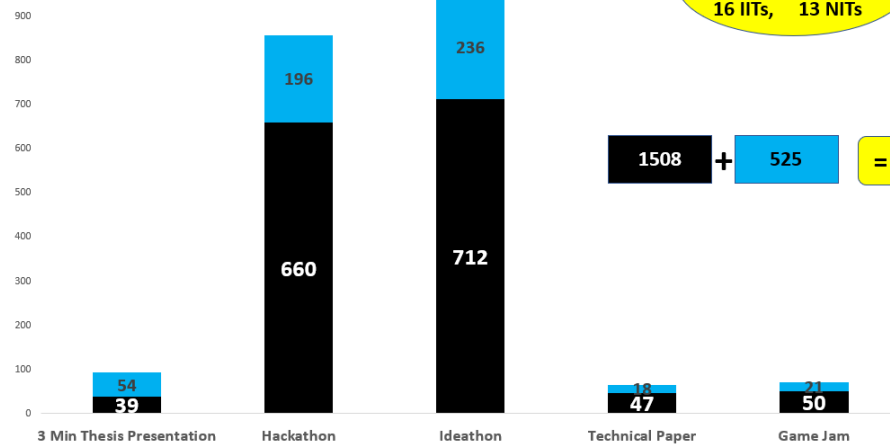


■ IIT J ■ External

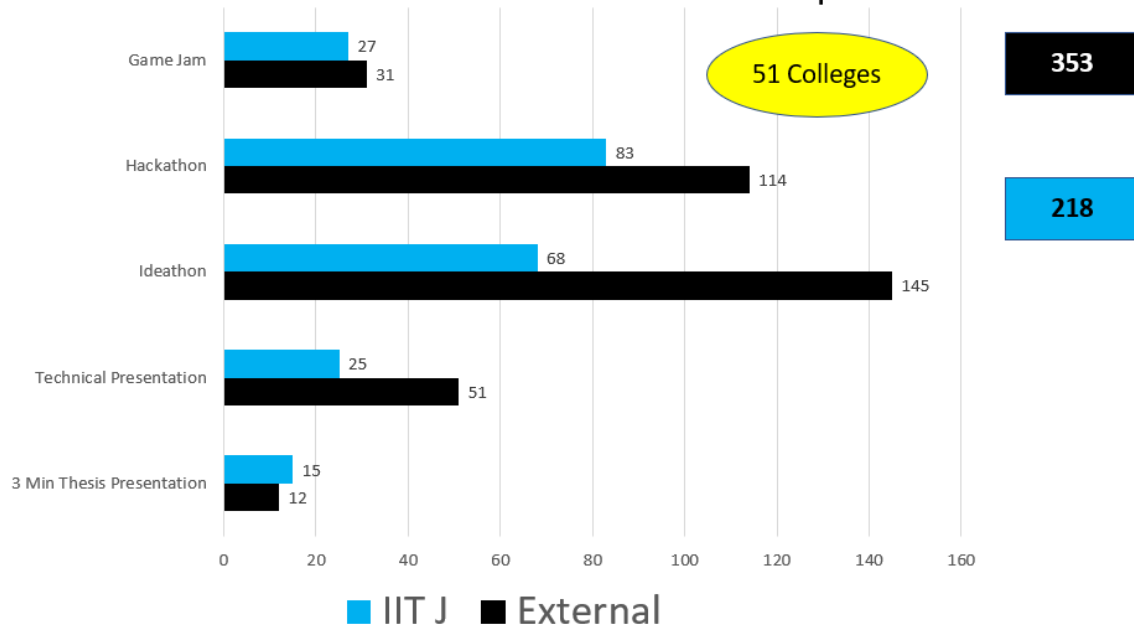
Registration status at end of 8 Sep

149 colleges

16 IITs, 13 NITs



PARTICIPANTS who attended the Youth Conclave competitions





## *Student Body While Planning Youth Conclave 2022*





## **EVENT CALENDAR :**



The poster features a dark blue background with decorative gold-colored vine borders in the corners. The title 'INAIE-SERB YOUTH CONCLAVE 2022' is written in gold. Below it, 'Program Details:' is in white, followed by a small gold floral separator. The schedule is listed with dates in gold and activities in white. At the bottom, there are two YouTube links with red play button icons, a globe icon, and the website URL.

**INAIE-SERB YOUTH CONCLAVE 2022**

**Program Details:**

15 Sep.  
**Inaugural Session**

16 Sep.  
**Hackathon/ Ideathon/Invited Talks**

17 Sep.  
**Technical Paper Presentation/ Invited Talks  
3 min Thesis Presentation**

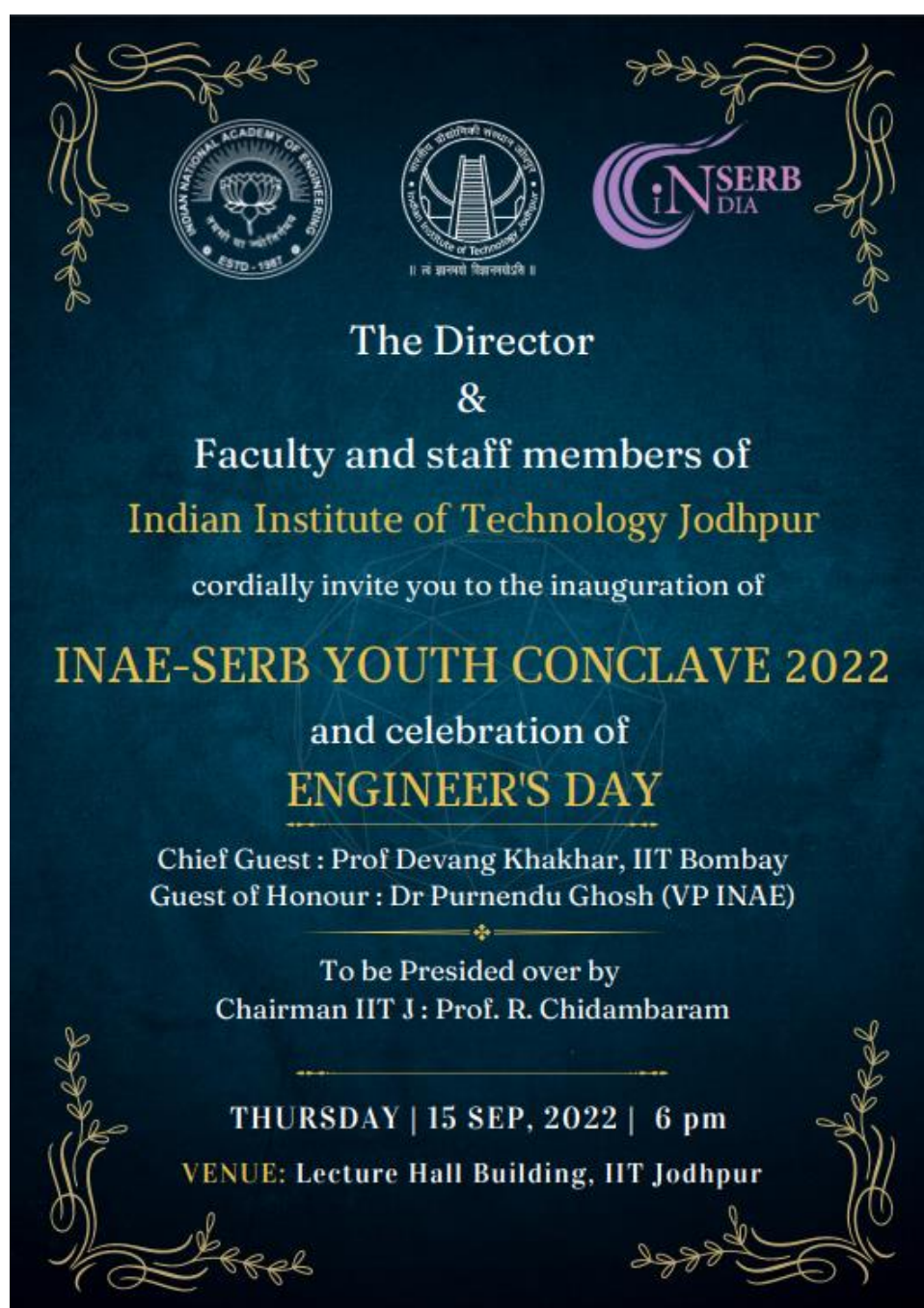
18 Sep.  
**Startup Showcase  
Plenary talk and concluding session**

15 September 2022 : <https://youtu.be/ohOF3xnaAqA>

18 September 2022 : <https://youtu.be/BI1hCSyXyZo>

<https://iitj.ac.in/inaie/>

**Inaugural Session:** Held on the evening of 15<sup>th</sup> September, the inaugural session involved the celebration of Engineers Day marking the birth anniversary of the country's foremost engineer, Bharat Ratna Visvesvaraya. The gathering was addressed by the Chief Guest Prof Devang Khakhar (IIT Bombay), Guest of Honour Prof Purnendu Ghosh (VP, INAE), IIT Jodhpur's Chairman Prof R Chidambaram, Prof Indranil Manna (President INAE) and Prof Santanu Chaudhury (Director, IIT Jodhpur). Vote of thanks was proposed by Prof S R Vadera (Dy. Director, IIT Jodhpur)





# ENGINEER'S DAY CELEBRATIONS

IIT JODHPUR ORGANIZES  
INAE-SERB YOUTH CONCLAVE 2022



**"Science is about knowing, Engineering is about doing."**

~Bharat Ratna Mokshagundam Visvesvaraya

## INAE-SERB YOUTH CONCLAVE 2022

15.09.2022

### *Inaugural Session*



Prof. Indranil Manna  
PRESIDENT, INAE



Prof. Devang Khakhar  
PROFESSOR, IIT BOMBAY



Prof. Purnendu Ghosh  
VICE-PRESIDENT, INAE



Prof. Santanu Chaudhury  
DIRECTOR, IIT JODHPUR

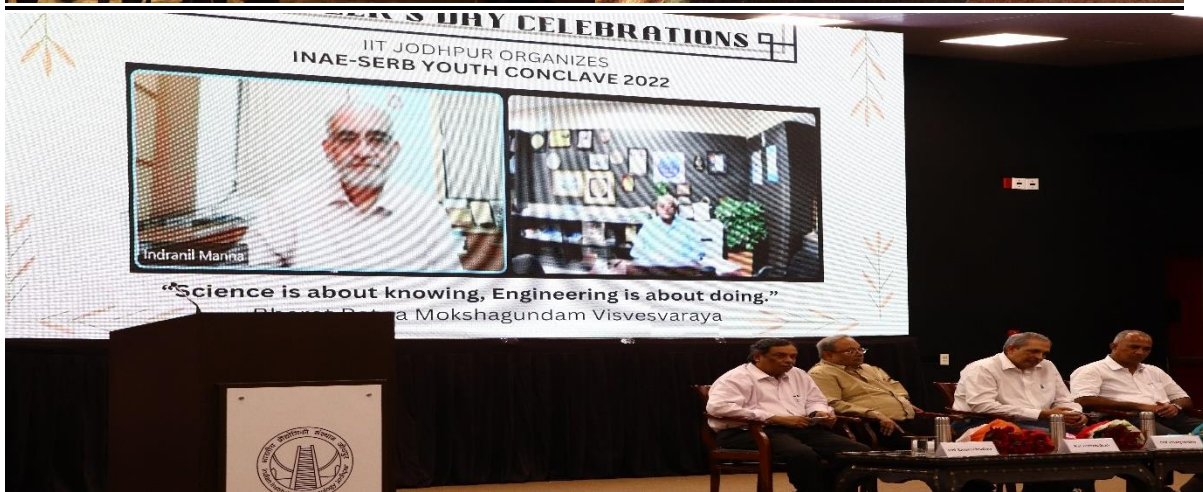


Prof. R. Chidambaram  
CHAIRMAN, IIT JODHPUR



Prof. Sampat Raj Vadera  
Dy. DIRECTOR, IIT JODHPUR





**Inaugural Ceremony**

## **TECHNICAL SESSIONS (Invited Talks and Paper Presentations):**

Technical sessions involving invited lectures by external guests and INAE Fellows, in the focus areas as per the theme of this year's Youth Conclave were held along with paper / poster presentation by participating students:



The poster is for the 'TECHNICAL SESSIONS' held on '17 SEPTEMBER 2022'. It features logos for the National Institute of Advanced Engineering (NIAE), Youth Conclave, INSERB DIA, and IIT Jodhpur. The text states: 'HELMED BY DISTINGUISHED SUBJECT MATTER EXPERTS, THE TECHNICAL SESSIONS WOULD BE ENGAGING, ENTERTAINING, AND EDUCATIONAL ALL AT THE SAME TIME. PARTICIPANTS WILL INVARIABLY GAIN INVALUABLE INSIGHTS AND PERSPECTIVE INTO TOPICS OF GLOBAL IMPORTANCE. AUTHORS SUBMITTING PAPERS NEED TO TRAVEL TO IIT JODHPUR TO PARTICIPATE IN EVENT.'

**TOPICS**

- Food: An Emerging Vista of Engineering
- Sustainability of Drinking Water
- Materials for Sustainability
- Quantum Technologies
- Experiential Interface
- Smart Infrastructure
- Digital Healthcare

**TECHNICAL PAPER SUBMISSION DEADLINE: 9TH SEPTEMBER 2022**

**MAXIMUM LENGTH OF PAPER IS 4 PAGES IN IEEE FORMAT**

**'BEST PAPER' PRIZE: 10,000/- FOR EACH TOPIC**







## *Invited Lectures*



In the subsequent seven pages, one dedicated to the seven focus areas, we list invited speakers, student participation and winners of the paper / poster presentations.



Dr. Anupama Ray – Introduction to IBM Quantum Computing

Mr. Godfrey Mathias – Quantum Computing and application

Prof. Prasanta K. Panigrahi – Emergence of quantum technology and Quantum computation

Dr. Subimal Deb - Self imaging in dielectric slab waveguides: paraxial and beyond

Over 200 students collectively attended the above sessions

\*\*\*\*\*

Registrations for competition: 20 students (IIT J : 7 students; Other institutions: 13 students)

Shortlisted for Technical Paper Presentation : 10 students

IIT J : 2 students; Other institutions: 8 students

**Winner :** Tomis from IIT Jodhpur

Shortlisted for Poster Presentation: 3 students all from Outside IIT J

**Winner:** Ayan Kumar Nai from IIT Madras



Dr. Alok Nath De - Envisioning 6G enabled cyber physical world

Mr Vivek Sirohi and Mr. Abhishek Singh - Smart Infrastructure

Prof Pranab Kumar Mohapatra - Integral water management for Smart cities

Over 400 students collectively attended the above sessions

\*\*\*\*\*

Registrations for competition: 20 students (IIT J : 2 students; Other institutions: 18 students)

Shortlisted for Technical Paper Presentation : 5 students

IIT J : 2 students; Other institutions : 3 students

**Winner:** Mohit Singh from IIT Jodhpur

Shortlisted for Poster Presentation : 2 students

IIT J : 1 student; Other institutions : 1 student

**Winner :** Aparna Singh from IIT Jodhpur



Dr. Bala Pesala (Ayur.ai, IIT Jodhpur) – Future of Digital Health: Living beyond 120 years

Dr. Rakesh Sarwal (Director, NMDFC) - Digital Health: Opportunities for an efficient health care system in India

Over 120 students and faculty attended the above sessions

\*\*\*\*\*

### **Digital Healthcare**

Total Registrations: 20 students (IIT J : 7 students; Other institutions : 13 students)

Shortlisted for Technical Paper Presentation : 5 students all from IIT Jodhpur

**Winner:** Dipro Mukherjee from IIT Jodhpur

Shortlisted for Poster Presentation : 4 students

IIT J : 1 student

Other institutions : 3 students

**Winner:** Arvinpreet Kaur from Birla Institute of Scientific Research, Jaipur



The banner is blue with white and yellow text. At the top left are logos for IIT Hyderabad, Youth Conclave, and INAE. At the top right are logos for iNSERB DIA and the Indian Academy of Sciences. The main title is 'INAE-SERB YOUTH CONCLAVE 2022' in large white letters, followed by 'MATERIALS FOR SUSTAINABILITY SEMINAR' in smaller white letters. Below this, the dates '16th September 2022' and '17th September 2022' are written in yellow. Under the 16th date are two circular portraits: Prof. Bhanu Sankara Rao (IIT Hyderabad) and Prof. Satyam Suwas (IISc Bangalore). Under the 17th date is one circular portrait: Dr. Gerald Tennyson (Senior Scientist, TCS Research).

Prof Bhanu Sankara Rao- Sustainability of Materials at elevated temperature in Energy sector  
 Prof Satyam Suwas – Tryst with materials engineering

Dr Gerald Tennyson, Senior Scientist: Accelerating material design for sustainability through digital technologies

Over 175 students and faculty collectively attended the above sessions

\*\*\*\*\*

Total Registrations: 28 students (IIT J : 10 students; Other institutions : 18 students)

Shortlisted for Technical Paper Presentation : 5 students

IIT J : 3 students

Other institutions : 2 students

**Winner:** Adarsh Bharti from IIT Jodhpur

Shortlisted for Poster Presentation : 15 students

IIT J : 6 students

Other institutions : 9 students

**Winner:** Subburayalu S from IIT Jodhpur





The banner for the INAIE-SERB YOUTH CONCLAVE 2022 EXPERIENTIAL INTERFACE SEMINAR features a blue background with white and yellow text. At the top left are logos for IIT Bombay, IIT Jodhpur, and the Youth Conclave. At the top right are logos for iNSERB DIA and the Indian National Academy of Engineering. The main title 'INAIE-SERB YOUTH CONCLAVE 2022' is in large white letters, followed by 'EXPERIENTIAL INTERFACE SEMINAR' in smaller white letters. Below this, the dates '16th September 2022' and '17th September 2022' are highlighted in yellow. Under the 16th date, three speakers are listed with their circular portraits: Dr. Avinash Sharma (IIT Hyderabad), Dr. Rajendra Nagar (IIT Jodhpur), and Dr. Lipika Dey (Chief scientist, TCS Research). Under the 17th date, one speaker is listed: Dr. C V Jawahar (IIT Hyderabad).

Dr Avinash Sharma - Learning based 3D Digitisation of Humans & Terrains

Dr Lipika Dey Conversational Systems: Carrying on the conversation

Dr Rajendra Nagar - Introduction to Metaverse

Prof C V Jawahar - Towards Safe Driving in Unstructured Environments

Over 600 students and faculty collectively attended the above sessions

.....

Registrations for competitions : 11 students (IITJ : 8 students; Other institutions: 3 students)

Shortlisted for Technical Paper Presentation : 5 students

IIT J : 4 students

Other institutions : 1 student

**Winner:** Abhirama Subramanyam from IIT Jodhpur

Shortlisted for Poster Presentation : 2 students from IIT Jodhpur

**Winner:** Jayesh Khandelwal from IIT Jodhpur



**INAE-SERB  
YOUTH CONCLAVE 2022**

**SUSTAINABILITY OF DRINKING WATER SEMINAR**

**16th September 2022**

**17th September 2022**

**Dr Anand Plapally**  
IIT Jodhpur

**Prof Pradip K Tiwari**  
IIT Jodhpur

**Prof Sirshendu De**  
IIT Kharagpur

Prof P K Tiwari and Dr Anand Plapally - Energy For Pushing Water And Lifting It

Prof Sirshendu De - Scalable and Sustainable Indigenous Technologies for Treatment of Groundwater and Industrial Wastewater

Over 250 students and faculty collectively attended the above sessions

\*\*\*\*\*

Registrations for competitions: 15 students (IIT J : 1 student; Other institutions: 14 students)

Shortlisted for Technical Paper Presentation : 5 students from Outside IIT Jodhpur

**Winner:** Deshbhushan Patil from BITS Pilani



Dr. C. Anandharamakrishnan, Senior Scientist CSIR – CFTRI, Mysore

Mr Arun Tangri, Tagtaste Foods Pvt Ltd

Over 100 students and faculty collectively attended the above sessions

\*\*\*\*\*

Registrations for competitions: 6 students (IIT J : 3 students; Other institutions: 3 students)

Shortlisted for Technical Paper Presentation : 5 students

IIT J : 3 students

Out Other institutions : 2 students

**Winner:** Vishnu Kumar from IIT Jodhpur





**Winners:**  
***Technical Paper  
Presentation and  
Poster Presentation***



## TALKS ON CONTROL SYSTEMS



The banner for the INAE-SERB YOUTH CONCLAVE 2022, held on 16th September 2022, features a blue background. At the top left is the logo of the Indian National Academy of Engineering (INAE) with the motto '॥ त्वं ह्यनस्यसे विद्यामस्यसेऽसि ॥'. Next to it is the 'YOUTH CONCLAVE' logo. The central text reads 'INAE-SERB YOUTH CONCLAVE 2022' in large white letters, with '16th September 2022' in orange below it. On the right are the logos for iNSERB DIA and the Indian National Academy of Sciences (INAS). Below the title, two speakers are featured in circular portraits: Dr. Subir Kumar Chaudhuri on the left and Prof. Bijan Bandyopadhyay on the right. Their names and affiliations are listed below their portraits.

**Dr. Subir Kumar Chaudhuri**  
Former Director, Research  
Centre Imarat DRDO

**Prof Bijan Bandyopadhyay**  
IIT jodhpur

Dr. Subir Kumar Chaudhuri: Hardware in Loop Simulation (HILS) the Gateway to Experiential learning with appropriate UIs

Prof Bijan Bandhopadhyay Continuous Integral sliding and implementation of sliding mode control



## **TALKS BY INAE YOUNG ASSOCIATES:**



Dr Swatantara Pratap Singh - Electro conductive surfaces and membranes for desalination and waste water treatment

Dr Rahul Mangal - Artificial swimmers : A life at micro scale

Mr Rakesh Gupta - Modeling and Simulation of Biological Barriers & Systems



Over 300 students and faculty collectively attended the above sessions

### **THREE MINUTE THESIS PRESENTATION:**

The 3 minute thesis presentation or 3MT is a competition where research scholars are challenged to present and state the significance of their research/ thesis in 180 seconds, in an engaging manner to an audience with non-research background. The task was to share their compelling story with a presentation and support it with arguments based on their research to engage people who have no idea of the specific research domain.



Total Registrations: 94 students (IIT J : 50 students; Other institutions : 44 students)

Shortlisted: 27 students (IIT J : 15 students; Outside IIT J : 12 students)

**Winners:**

Position	Name	Institute	Topic
First	Priyanka Saini	IIT Delhi	Improving the toughness and plasticity of bulk metallic glass
Joint Second	Gargi Konwar	IIT Jodhpur	Eco-Friendly Multifunctional Flexible Devices with Natural Materials for Sustainable Electronics
Joint Second	Ramavtar Jangra	IIT Jodhpur	Non-Thermal Non-Equilibrium (Cold) Plasmas for Better Indoor Air Quality: Contemporary Developments





## **HACKATHON :**



A hackathon is an intense competition with a time constraint where participants collaborate to develop POCs to address a specific issue. In this competition, a group of participants wrestles with a given a problem statement to come up with a solution and demonstrate it with a POC. .

Registrations: 214 teams comprising 862 students

IIT J : 44 teams comprising 196 students

Other institutions:: 170 teams comprising 660 students

Shortlisted: 44 teams comprising 197 students

IIT J : 18 teams comprising 83 students

Other institutions: 26 teams comprising 114 students

### **Problem Statements:**

1. Solution to monitor indoor heat and air quality and affordable solution for the migration of the same without using AC.
2. Design of a mid day meal for school, which can address iron deficiency in kids.
3. Detects adulteration in honey.
4. Extract energy from exhaust of a car.
5. Ease congestion in city roads when no increase in road space is possible.
6. Use mobile diagnostic devices for lung diseases.
7. Make an Alexa like device which can tell stories for a given collection of Indian toys.

8. Solution for harnessing solar energy using photosynthesis like process.
9. Solution for an Amphibious Autonomous Vehicle.
10. Implementation of Quantum Key Description protocols (BB84 or E91 protocols) on an FPGA board.
11. A supply chain for local artisans, so they can reach the market more effectively and get their value too.
12. Design a novel approach to identify and segment lunar craters.
13. Creating Metaverse for Educational Training using games and simulations.
14. Affordable (low cost, less than Rs. 20 per kL of treated water) and sustainable (long lasting with minimum / no maintenance) technology for drinking water without compromising its quality

### Winners:

Position	Team Name	Institute	Problem Statement
First	Dynamatrix	Indian Institute of Technology, JAMMU	Use mobile diagnostic devices for lung diseases.
Second	Unstoppables	Government Women's Engineering College, Ajmer	Make an Alexa like device which can tell stories for a given collection of Indian toys
Third	Enigma	IIT Jodhpur	Extract energy from exhaust of a car.





## **IDEATHON:**

An ideathon is a brief, intense event where students can work on some of the most important problems that the world is facing today. Ideathons are brainstorming events where people with diverse knowledge backgrounds, skill sets and interests get together to wrestle with



predetermined problems, and come up with substantive, innovative and comprehensive solutions. An ideathon's output might be ideas, a roadmap or an actionable plan. Teams leverage design thinking and cutting-edge techniques to brainstorm and collaborate on potential solutions within a given time frame.

Total Registrations: 236 teams comprising 907 students

Inside IIT J : 55 teams comprising 236 students

Outside IIT J : 183 teams comprising 712 students

Shortlisted: 50 teams comprising 213 students

IIT J : 15 teams comprising 68 students

Other institutes : 35 teams comprising 145 students

## Problem Statements

1. Create a blockchain-based efficient supply chain solution for the Indian markets, which solves problems like invoice validation and transaction time.
2. Tracking and predicting climate change: Can quantum computing provide a solution?
3. Is personalized food possible ? How ?
4. Digital currency: What should be a transparent and green solution ?
5. Bioenergy: How can it be harnessed for generation of electrical power ?
6. Can mixed reality systems bring real world engineering experience to engineering students in the classroom ? How ?
7. How can food wastage and adulteration be decreased?
8. Sustainable Water: Technology and Business Solutions

## Winners:

Position	Team Name	Institute	Problem Statement
First	Reality Rewired	Birla Institute of Technology and Science,Pilani Campus	Can mixed reality systems bring real world engineering experience to engineering students in the class
Second	Nutro Health	Indian Institute of Technology Jodhpur	Is personalized food possible ? How ?
Third	Eternal	Jamia Millia Islamia	Digital currency: What should be a transparent and green solution ?



# Ideathon



## GAME JAM:



A game jam is an accelerated opportunistic game creation event where a game is created in a relatively short time frame exploring given design constraint(s) and end results are shared publicly.

Total Registrations: 49 teams

Inside IIT J : 15 teams

Outside IIT J : 34 teams

Shortlisted: 18 teams comprising 58 students

IIT J : 8 teams comprising 27 students

Other institutes : 10 teams comprising 31 students

Themes:

1. Indian culture and ethos
2. Alternate physics
3. Save the green planet
4. Biosphere in Metaverse
5. Theory of Mind.

**Winners:**

Position	Team Name	Institute	Problem Statement
First	Kamand Helix	IIT Mandi	Theory of mind
Second	KAMAND HOAX	IIT Mandi	Save the green planet
Third	Hipsters	IIT Jodhpur	Save the green Planet
Consolation Prize	Game Developer's Community, SRM	SRM University Tamilnadu	Indian Culture and Ethos



**GAME**



**JAM**

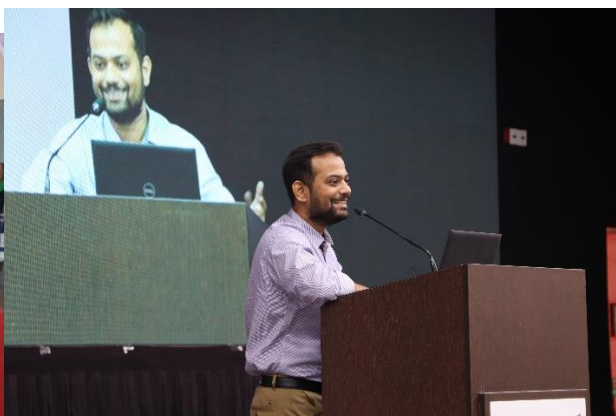


## START-UP SHOWCASE:



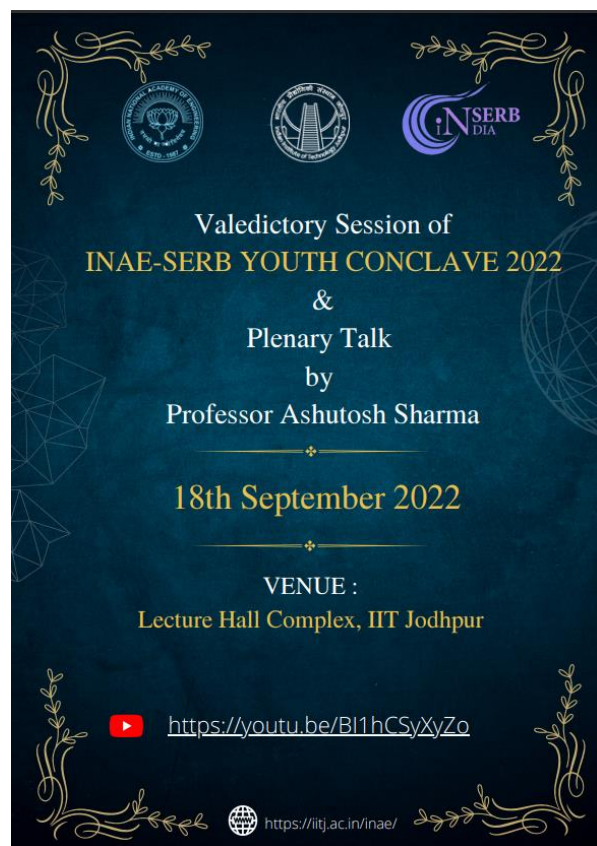
The guest speakers were entrepreneurs who started their entrepreneurial journey while being students themselves. Sibabrata Das, Manya Jha, and Dinoj Joseph delineated their journeys and the various trials, tribulations and delight that a start-up and its founding team

goes through, when trying to make it on their own. The participants got the opportunity to ask questions and get answers on various aspects of technology entrepreneurship.





**VALEDICTORY SESSION:** The Valedictory session was conducted on the 18<sup>th</sup> of September. The Plenary Address was given by the Chief Guest Prof Ashutosh Sharma (Former Secretary , DST and Institute Chair Professor , IIT Kanpur). Shri RV Hara Prasad (Director, DRDO ) delivered his address as Guest of Honour. Prof Indranil Manna (President, INAE ) delivered the Presidential address and Prof Santanu Chaudhury (Director, IIT jodhpur) delivered the Director's address. Vote of thanks was proposed by Dr Sankalp Pratap of School of Management & Entrepreneurship, IIT jodhpur. Awards were given to all winners, and the program concluded on a high note with the collective satisfaction that this edition of Youth Conclave had set new benchmarks both in number of participants and in kind of innovation / entrepreneurship focused events and competitions for the youth of the country.



## **INFORMAL EVENTS:**

A variety of informal events were also organized by the student body to engage their fellow participants who came to Jodhpur from all over the country like Open Mic Night, Local Folk Singers event and EDM Night.

A few glimpses:

