

# MID-TERM WORK REPORT

2022-23

Innovate | Tinker | Create



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# MID-TERM REPORT

Core ITC

GSTA

Aniket Agrawal

PnTT

Piyush Porwal &  
Payal Choudhary

PG Nominee

Sushanth Seepana

Admin Head

Nitish Agrawal

2022

# Core ITC Initiatives

## Work Report 2022

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## Institute Technical Summer Project

This summer, we organized ITSP 2022 under Institute Technical Summer Activities, a 3-month intensive program in which teams started their projects from scratch. We saw the participation of **130+ teams**, **40+ projects** from various domains of Artificial Intelligence, AR-VR, mechatronics, aerial robotics, biotechnology, market analysis, agriculture, etc., are completed. The top 6 teams have been awarded tech vouchers worth Rs 30000 and 4 special mentions. Prof. RK Pant distributed a certificate of Mentorship and Participation at the Closing Ceremony of ITSP. ITSP Booklet with all significant projects was published with copies distributed in Dean's Offices.



The event was a success, with an overall **y-o-y increase of 80%**. Post this; the booklet was launched. Link to the same:

[https://drive.google.com/file/d/1VaSFKRuZSl4\\_MFZoOXESJGvJp76sfG/view?usp=sharing](https://drive.google.com/file/d/1VaSFKRuZSl4_MFZoOXESJGvJp76sfG/view?usp=sharing)

Some of the ITSP teams have pitched their projects in IDEAS Program.

## Founders' Garage

ITC, in collaboration with E- Cell, launched Founders' Garage 2022 to take a project/prototype into a product. The event started with the Orientation of Founders' Garage. The whole process is divided into two phases - Idea and prototyping. Completed speaker sessions and business and technical mentorship. Sessions on idea generation, design thinking, customer validation and identification, BMC, etc., were conducted targeting UGs and PGs.



## Tech RnD Expo

A two-day event showcasing the mind-blowing work done by various tech teams + projects of independent students all over the institute.

Industrial talks from various domains like Digital health, Improved battery technology, product technologies, and workshop by e-Yantra.

First-time fun activities were included, including VR Gaming, drone flying, and walking water pool. 30+ company representatives and alumni visited Expo.



The event saw **10K+** visitors, including students, faculty, alumni, and industrial personalities. Link to the after-movie of the Expo:

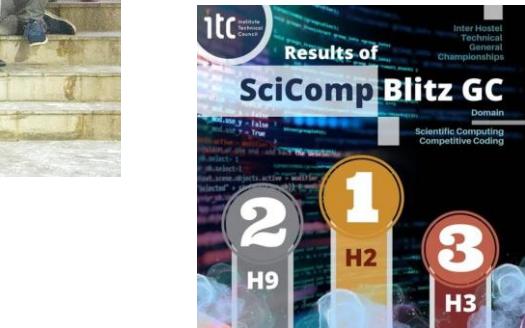
[After Movie | Tech And RnD Expo | 2022 #techiitb](#)



## Tech GC 2022-2023

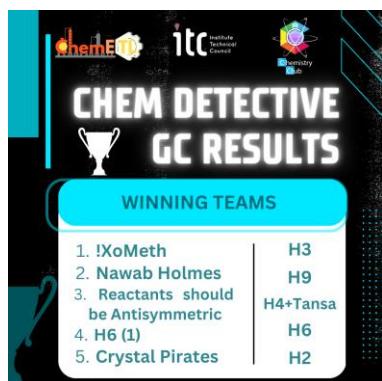
Conducted the GC orientation combined with the prize distribution ceremony of ITSP. Announcement of GC Cup Winners 2021, rules and regulations of GC 2022. Saw the participation of 250+ students from various hostels.

Four GCs, SciComp Blitz, Analytics Club, Chem-Detective and Computational Drug Discovery GCs successfully conducted.



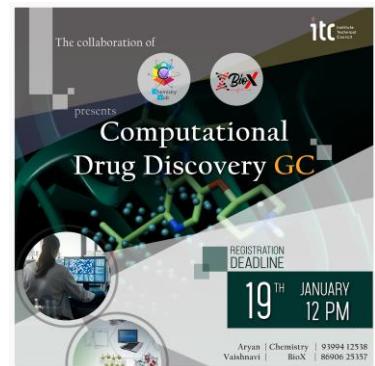
## Chem-Detective GC

15 teams participated in this 4 day event conducted in collaboration between Chemistry Club and ChemE TL. It was conducted in two parts: Experimental and theoretical based on the theme of water quality detection.



## Computational Drug Discovery GC

40+ teams participated in this event conducted in collaboration between the Chemistry Club and BioX where the participants were exposed to unique topics such as drug docking, drug synthesis, pharmokinetics and industrial production.



## ITA Awards

Institute Technical Awards (ITA) ceremony is held by the ITC every year. The purpose behind it is to appreciate the young minds who achieved excellence in the field of Technology and to motivate other growing fellows to be even more hardworking for achieving excellence which is conditioned to Awards.

This year also we felicitated a few students who had shown extraordinary contributions to Tech in the year just before covid.

The mail has been sent for next year's registrations for the ITA awards.

Ongoing - We have to select the panel that will judge the submissions.



## PG Orientation and PG Tech Weekend

- PG Tech Orientation was organized on 29-30 July, giving insight into the tech culture of IIT Bombay.
- 4 PG Conveners were selected to promote tech culture in PG Community & bring their PoV to discussions.
- Conducted PG Tech weekend on 1-2 October, according to the research interests of the PGs.



## IxT Series

- A new initiative, IxT (Industry x Tech) Series, was initiated in collaboration with IITB Research Park launching industry-level projects, problem statements, and challenges.
- As of now, there are two collaborations, first with ideaForge, where a **4 PS challenge** was released and gathered an excellent response. Overall, around ten teams made it to the final stages.
- The second is with CTech Labs, where industry projects in the domain of EVs were released. They, too, had a good response, and overall, **ten interns** were selected.



## Tech Mentors

A tech mentor will be a **first-hand guide** to the fantastic journey of tech awaiting at IIT Bombay. With this aim, we introduced a **first-time Tech Mentor Program** in UG orientation 2022.

**450+ freshers** showed their interest.

Objectives-

- To help first-year undergraduate students understand the challenges and opportunities in tech present at IIT Bombay.
- To provide positive role models to all undergraduate students in the institute.
- To provide senior guidance to freshman students and help them excel in technology.
- We finalized a list of Tech Mentors who have been previously involved within the tech community
- Ongoing - Guidelines session for mentors will be conducted & mentors will be then mapped to mentee

## Convener Camp

We organized an event of 2 days for conveners. The primary motivation for that was to increase the interactions between conveners of the ITC. On the first day, we had some important talks regarding the structure of ITC and movie night in LT PCSA. We taught them presentation and video editing skills on the second day in the LC classroom. The overall event was successful.



## Communities and Tech Teams –

**Cyber Security** - The CSeC club was integrated under ITC this year. Club Activity details later.

This year, we continued the Year of Security, in which we covered foundational technical knowledge required in the field. We introduced a new series, SEC Talks, in which we invited industry leaders and experts to share their profound knowledge and experience with the audience. Our hands-on "Hacking-via-CTF" session was well-received by UG freshers and PG seniors.

Besides conducting convener training sessions and various orientations, we facilitated seminars held by the TRUST Lab, ISRDC, and IEOR Department. Additionally, we revived our Reading Group with some stimulating paper discussions. We introduced a fortnightly Instagram series, "How the Hack?" in which the readers accompany our beloved mascot, Quack the Duck, in revealing security's biggest secrets.

### HealthCare Student Community:

ITC, in collaboration with KCDH, a community with 150+ participants has been built to cater to people interested in digital healthcare. There are plans for Debates & Case studies to be conducted in the upcoming days.

### Tech Teams:

Orientations and Workshops for Tech Teams have been planned this month. Recruitment will go on parallel. Numerous steps have been taken to ensure the publicity of these tech teams and help them get the required support.



## Inter-IIT Meet 11.0

- Contingent Leaders and Core team selection are made.
- Inter IIT contingent portal has been released for databasing the skills of students.
- Also the B76 guide is also released, which helps to understand the entire Inter IIT Tech Meet process and is a one-stop destination for all queries.
- 4 high prep PS released, and team selections are made. Students have started working on each PS.



## Learners' Space

In its sixth edition, Career Cell, with the help from ITC, conducted Learners' Space in a revamped Summer Online Material Course format on MoodleTM to streamline the logistics of the courses and improve assessment of progress.

With a prodigious number of **6500+ registrations**, it extended over a month to accommodate the contracted academic year and covered a wide range of courses catering to various tastes of the students, to give them a headstart in the field of their interest. It aimed to be a learning platform where students' enthusiasm will be the only thing required to join a course.

Just like past few years, Technical Summer School was launched with a wide range of courses that saw **3000+ registrations**. This year we introduced several new courses like Aerial Robotics, Introduction to Blockchain, Fundamentals of Forensic Sciences, Global Strategy, International Relations and Management: Energizing Businesses and Economies.

TSS is an integral part of Learners' Space, where one can learn and choose from an assortment of courses that develop some of the necessary applied skills required to build a strong technical profile.



## UG Orientation

The event was conducted in the first week of November. We describe the overall structure of ITC to the fresher's junta. The event was overall interactive. We had put in several games to make it interactive. All clubs got the chance to showcase themselves to the freshie people. The enthusiasm of the overall freshie junta is great. We did the freshie intro video too.





Fresher's intro videos :

<https://drive.google.com/drive/folders/13-Z9KAwiVzQULNK6rrSZ6rpGey95oIEU>

## Publicity and Outreach

### Instagram

So in this tenure of ITC we focused on post and pre-publicity of events both. We bring forward the reel culture. The reels(Videos) attract more people to our Instagram channel, due to which we can see significant growth in the number of followers overall.

### Linkedin

We activated the ITC account on LinkedIn too, by posting about the main events of the ITC, like TechRnd and all. This proves helpful in attracting some of the sponsors through LinkedIn as this is the platform for official exchange.

### Portal Launches

This time the web team did fabulous work by introducing various useful portals.

- Techpoints portal
- Bill Reimbursement Portal
- Inter IIT portal
- Student wellness center

# MID-TERM REPORT



Aeromodelling  
Club

**Secretary**  
Akshat Verma

**Conveners**  
Hemant, Manas, Ameya,  
Disha, Hitaishi, Vraj,  
Amit and Abhay

2022

## INTRO

The Aeromodelling Club has always been a hub for aviation enthusiasts and a place to explore, build and master absolutely every skill pertaining to aeromodelling and aerial robotics ranging from building model aircraft, and drones to a plethora of sophisticated projects with an aim to promote this hobby to the student community and beyond along with enhancing the research in this domain.

With this, we present to you the activities of the tenure so far.



INNOVATE | AVIATE | FLY

## EVENTS

### RC 3D Airshow

The RC 3D Airshow was organized on 3rd May at the Gymkhana grounds to showcase amazing flying by expert aeromodellers. The event featured Mr. Sohrab Mistri - one of the best RC plane pilots in the country with his awe-inspiring piloting including many 3D aerobatic stunts like rolls, loops, hover, inverted flight, and much more. Demonstration and explanation of the build of a 120cc 3D IC Engine Plane were done by Sohrab for the audience.

The event also featured **5 trained FPV drone flyers**, including Mr. Puneet Xaxa, Mr. Utkarsh Verma, Mr. Siddhesh S, and Mr. Smit Kesaria along with several micro and nano drones, from the aeromodelling community in Mumbai who performed multiple flights involving FPV chases of the RC Planes, standalone FPV showdown doing power loops, full-throttle passes, turtle modes, and FPV live stream and videography.



The event was also utilized to showcase two recent aircraft builds in the club - a 1.5-meter wingspan FT Storch model and an aerobatic FT Sportster model - built and flown by the team. The event saw huge enthusiasm and participation from a wide variety of audiences including UG and PG students across departments from all years.

Prof. R. K. Pant and Prof. Dhwanil Shukla from the Aerospace Department graced the occasion as the Chief Guest and motivated the club's activities.

## QUADCOPTER FLYING SESSION for INYAS students

On 10th June 2022, we had numerous wonderful and curious visitors, around 30 students of the Indian National Young Academy of Sciences (INYAS). The students were introduced to the basics of quadcopters, their design, flight dynamics, and control.

They were given a hands-on experience of flying PlutoX drones while maneuvering through the loops, rings, and obstacles in the LH Foyer. We also showcased the different types of aircraft builds to the students and kindled an interest in pursuing aeromodelling. The event had Prof. Arnab Dutta in a key role in giving us the opportunity to interact with the students.



## AERIAL ROBOTICS COURSE (TECHNICAL SUMMER SCHOOL)

This year in the Technical Summer School, the Aeromodelling Club conducted the Aerial Robotics Course. The course saw a great number of registrations from students of different backgrounds. The four-week course was designed to start with the basics of MATLAB, diving further into PID and 1D quadcopter control. The further sections of the course introduced the concepts & implementation of 2D and 3D quadcopter control. In a later section of the course, the participants got equipped with a conceptual understanding of different path-planning algorithms used for autonomous UAVs.



A total of 20 students were able to complete the final course completion criteria and were felicitated with course completion certificates by the Career Cell, UGAC. Moodle was used as the course platform along with other TSS courses.

## TRIVIAJET 3.0 - THE NATIONAL AVIATION QUIZ

We organized the third successful edition of the national aviation quiz of the year - Triviajet 3.0. The event saw amazing participation from 10+ colleges globally.



The event occurred in two stages - prelims on 24th July and the final competition on 25th July. The event consisted of thrilling rounds, exciting questions, and buckets of knowledge poured onto the participants. The event was also live-streamed on the club's YouTube channel.

## BON VOYAGE (FAREWELL)

A fun and inspiring afternoon with the beloved club seniors graduating in 2022 was organized in TL on the day of convocation 20th of August. Several of the seniors graced the occasion with their presence and had an amazing time remembering their tenure as a convener and cherishing the memories made with the club. This amazing interaction filled the whole team with much more zeal and motivation.



## RC PLANE COMPETITION



The annual flagship event this year - the RC Plane Competition - was one of the most unique editions ever in the history of the event and the club. This edition saw many pathbreaking add-ons to the event and boosted the scale and technical prowess of the competition in terms of both the quality of participation and the quantity of the enthusiasts impacted. We were glad to have introduced industrial collaboration at the event for the first time, as this year's edition was powered by ideaForge, a leading drone manufacturing company across the country.

## Orientation and Registration (4th to 11th Sept)

The event orientation was held on the 4th Sept marking the start of registrations. Through the event, we informed the enthusiastic students about what they'll be learning, followed by a timeline of the event. We showcased unique designs of RC planes built by conveners. Jai Jobanputra (ex-secretary), Piyush Porwal (ex-manager), and EshuKoli (winner of the RC plane competition'21) shared their experience and learnings with the audience. We saw the participation of a diverse group of students ranging from sophomores to even Ph.D. and master's students. We got the marvelous and all-time greatest registration from 111 teams, each consisting of 4 students (summing up to 444 participants) for the event.

## Design session (22nd Sept & 23rd Sept)

Seeing a large number of participants, we conducted 4 design sessions. The design session introduced the students to how planes fly, lift theory, the components of an RC plane, and how the control surfaces affect motion. Various configurations of a plane were also introduced to explore more designs of an RC plane. Everyone was taught how to design and build RC planes from scratch and how to deal with electronics. The students were given some basic but important techniques and thumb rules to design their plane. At the end of the design sessions, they were equipped with all the required materials to build their plane.



## Build session (26 Sept to 7 Dec)

In this period, teams built their planes in TL with unique craftsmanship and aeromodelling sense. The whole club team and the mentors performed a crucial inspection of the designs and build of all the planes to ensure they would fly well. Mentors also showed continuous guidance to their teams. This year we had amazingly innovative builds by the teams which included the build of flying wings, parachute deployment systems, bottle fuselages, and models of military aircraft. The participants displayed great zeal and enthusiasm and a total of 100+ planes were built over the days.



## Simulator sessions (26 Sept to 7 Dec)



Along with build sessions, teams learned and practiced how to fly a plane through simulator sessions. Each of the 111 teams was given 3 slots (a total of 2 hours) according to their convenience. Teams practiced flying, controlling the aircraft during the cruise, safe landing on the desired spot, and various manoeuvres.

## Build and design inspection sessions (8th & 9th Oct)

Build and design inspection sessions ensured that the aircraft built would be safe to fly and that no major issues would be faced during the upcoming flying sessions. In these sessions, the teams were taught about all the electronic connections, receivers, transmitters, motors, CG balancing, and LiPo batteries. They were instructed to ensure safety while handling LiPo and propellers. We conducted short conceptual vivas to know their understanding of design. At the end of these inspections, teams knew the pre-setup required to fly their planes.

## Flying sessions (10th Oct to 22nd Oct)

Flying sessions took place on the Gymkhana ground test out the team's flying skills and their planes on the field. We saw tremendous excitement in teams to fly their planes the first time on the field. As the sessions proceeded, we saw great progress in the flying skills and perseverance in the teams to repair the crashed planes (as some of them couldn't perform safe landing the first time) and again made them ready to fly for upcoming flying sessions. Teams learned technicalities like trimming the airplane, checking the control surfaces, mounting the propeller, etc. More than 95 planes demonstrated good flight during the sessions, while the others too showed great participation.

## RC Plane 2k22 Final Competition (29th, 30th & 31st Oct)

And the most awaited day came. Teams were ready to showcase their mind-blowing planes and epic flying skills with skilled maneuvers. Teams were asked to do all the electronic setup and to follow pre-flight steps. All the participants were given two chances to showcase different skills. The competition was completed in 3 days.

## RC Plane 2k22 Closing ceremony (2nd Nov)

The winners were felicitated during the ceremony and honored by Prof. RK Pant, Chairman (Technical), Students' Gymkhana, and Mr. Rahul Singh, Co-Founder, ideaForge.

The ceremony also applauded teams with Innovative designs and Exceptional Mentors of the event. The winners were awarded amazing drones from Drona Aviation to tinker with! Dr. Harish Padinjarethil, SAC Incharge also graced the occasion with his presence. The ceremony also observed a talk by Mr. Rahul Singh about the development of ideaForge and Prof. Pant and Aman Malekar (last to last secretary and enthusiast) about the development of the aeromodelling community.



*To sum up, the experience the participants had in the event, we received this from one of the participating teams!*



## POWERED GLIDER WORKSHOP

We organized a workshop under the guidance of Dr. Rajesh Joshi (Ph.D. in Aeromodelling) from Aerovision Indian. He inculcated a new thought that Aeromodelling is not just a hobby; anyone can pursue an in-depth study of Aeromodelling. We saw notable participation (50+ participants) from school students and students from IITB itself. Prof. R.K.Pant and a few more professors were also present out of their curiosity.

The workshop took place in two sessions. In the first session, students made a chuck glider from balsa wood, experimenting and learning the concepts of Aerodynamics. Participants built a rubber-powered propeller glider in the second session, followed by flying the gliders. Dr. Rajesh Joshi also showcased the working prototype of the Wright Flyer & lightest powered glider of 1 gm.



## Technical Projects

### Aadya I

The club members, Ameya Bijith Marakarkandy and Disha Gupta tried manufacturing and launching a model rocket with the improvement upon the design of the model rocket kit by using better fins and a parachute-based recovery system. The motors worked wonderfully, the ejection charge was successfully able to deploy the parachute recovery system and the structural integrity of the rocket was maintained making it possible to essentially re-use it with a new motor. The mission of Aadya 1 was to restart model rocketry in our club and institute and eliminate the fear of trying something new. The series would be followed by the implementation of the electric ignition method and active fin stabilization in the upcoming semester.

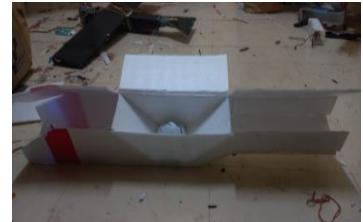


## COMPETITIONS

### Boeing Aeromodelling Competition

This competition, sponsored by Boeing, is known to be one of the top Aeromodelling competitions in India. A team of Abhay Soni, Ameya Bijith Marakarkandy, Hemant Meena, and Vraj K Patel from the Aeromodelling club IITB took this challenge to solve the problem statement.

The team designed highly efficient aircraft with payload-carrying and dropping mechanisms. The team explored various airfoil shapes to get the most aerodynamic wing and built the wing using Balsa and Depron sheets. The team showcased the flying of the plane in the IIT Bombay zone. This aeromodelling team also aims to compete in the IIT Madras zone with a few improvisations.



### Flipkart Robotics Grid Challenge 4.0

A team of seven- Ameya Bijith Marakarkandy, Ashita Dutt Sharma, Disha Gupta, Hemant Meena, Manas Agrawal, Dhruv Kumar Khetan, and Akshat Verma aim to solve a problem statement given by Flipkart in collaboration with IIT Madras.



The PS includes building an autonomous delivery drone. It should be able to do ArUco code marker and color detection and process the image to identify the object, followed by picking it using a claw mechanism or electromagnet and dropping it in the dropzone in the shortest possible time. The team has achieved the ArUco detection and Pixhawk setup for the drone along with the hardware build. The team members have learned extensively in the domain of image processing and quadrotor control.

## Upcoming projects

The Club will be releasing technical projects soon for aviation and technical enthusiasts. The project ideas include-

- Active Fin Stabilized Rocket
- RC Cockpit
- Vertical Take-Off and Landing (VTOL)
- RC Ornithopter
- RC Helicopter
- RC Hovercraft
- Coanda Effect Saucer

Extensive work has been done on the abstracts and plan of action for all these projects and we are all set to launch them.

## SOCIAL MEDIA

Maintained the Facebook page with 7.9K followers. We increased our Instagram page followers from 1500 to more than 1840, an increase of about 23%. We tried to engage more people through Instagram pages by launching a series on RC Plane "Rewind" achieving a reach of 6500+ people. The videos of the events and activities were uploaded on YouTube.



# MID-TERM REPORT

## BioX Club

**Manager**  
Vaishnavi Agnihotri

**Conveners**  
Ayush, Arpit, Divyanshu  
and Shreya

2022

## Introduction

BioX Club, IIT Bombay, is a student organization that, through its events, workshops, and talks, strives to increase in students the level of enthusiasm and knowledge for diverse fields of Biology and, therefore, to make a community of bio-enthusiasts.

The main aim of this club is to highlight the link between biology and engineering and thereby provide a better answer to how we as engineers could contribute to the healthcare sector.

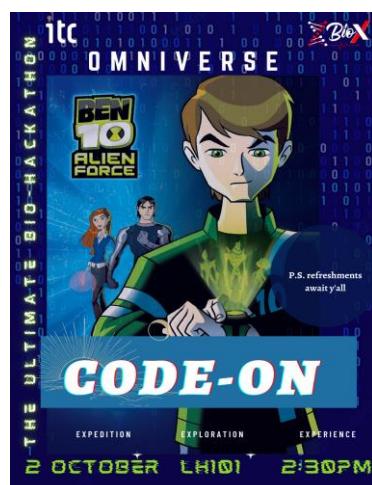
In the first half of the tenure, the club gave rise to many exciting activities and drafted a course on Forensics in the Technical Summer School. We have made good progress in establishing Team iGEM, IIT Bombay.



## Events

### Code On (2nd October 2022)

Code On event was coined in the 2020-21 Tenure, but the execution was done in our tenure. It is a coding competition based on bioinformatics. Here the participants had to code genome sequences. To make the event more fun-filled, we decided to go for genomes of BEN 10.



## Timeline of the event :

### 1. Pre Registration

Execution of the first significant tenure event began with a pre-registration period initiated after Bio-Cypher. The purpose behind this was to get a clear idea of what participation we should expect from the event. Apart from this, We planned to provide a few more problem sets and extra 6 hours to the pre-reg candidates. We didn't formulate any mail for the pre-reg, as we wanted to benefit the loyal candidates of the club, i.e., those who follow instagram and Fb pages and keep track of club activities.

### 2. Publicity and Registration Starts

We received an enormous number of 260+ registrations for our first event, which was indeed a massive success.

### 3. Event

The event commenced at 6 pm sharp. There were four characters with seven problem statements each. The problems of different characters were almost the same. One of the problems was wrong, and we had to cancel it. We did not get any assistance from any proficient person with coding, which created difficulties for us.

### 4. Bonus Round

After 24 hours from the event's commencement, we started the Bonus questions round. As many candidates who worked hard for the competition but did not pre-register, we ensured they didn't feel unprivileged. There were just three questions worth ten marks, so the bonus round should not create a huge difference.

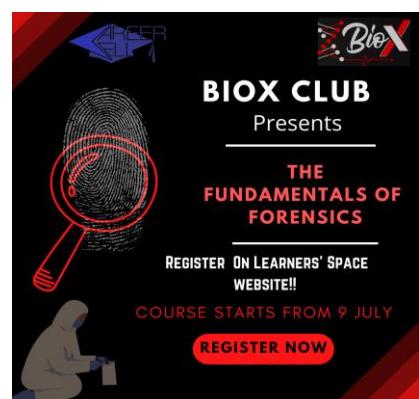
### 5. Prizes

The prizes have been purchased and we would be distributing the prizes along with the club orientation, in order to create a spirit among the freshies and boost the confidence of our winners.

## Courses

### Introduction to Forensics

BioX Club introduced a course on Forensics in the Technical Summer School (TSS) organized by UGAC. It was a 4-week course with continuous assessments and evaluation, which provided a deep insight into various topics related to synthetic biology.



As the moderators themselves were new to the course, we took assistance from someone who had a better knowledge of this field. Each week's material consisted of pre-recorded lectures. A particular timeline was provided to students according to which they were required to watch the lessons. Moreover, the evaluation consisted of an **assignment**, **midsem**, and **endsem**. Questions were framed in such a way that plagiarism could be avoided.



## Tech Team

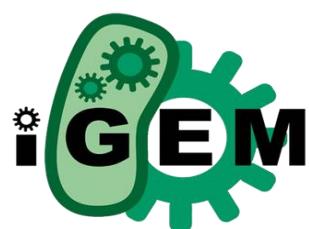
### iGEM Team Initiation (August 2022)

iGEM is a worldwide synthetic biology competition. Various Indian colleges have their iGEM teams. We discussed establishing the iGEM team of IIT Bombay. Of course, this would be initiated by the BioX Club. So we just created a blueprint of what all needs to be done before starting an iGEM team. Conveners' transparent and honest opinions were taken to ensure that they knew the outcomes (pros and cons, time commitment). In the beginning, all of us had a very vague idea about this, and we planned to meet with some other institute that has a well-organized iGEM team.

We organized a meet with the iGEM head of IISER Bhopal and IISER Pune, and he explained every detail of iGEM thoroughly.

That conversation was terrific for us as we grasped all the dos and don'ts for iGEM. This was our first inter-college meet. Though it wasn't a big one, it was the first time we communicated with some other institution's bio club.

We have contacted Prof K V Venkatesh, who was the iGEM Facad when IIT Bombay participated in iGEM back in 2009. Meets were set up with the alumni who were then a part of the iGEM team.



## Club Activities

### Convener Training (June- August 2022)

Convener Training was one of the most prolonged activities conducted in the first half of tenure. The whole convener training was divided into three phases :

- 1st phase involved creating a **database** of various speakers who have done wonders in the field of biology; drafting a **mail template** for inviting them, and creating **posters** for talk-show or events.
- 2nd phase was further subdivided into three checkpoints. This part involved profound ideation of our upcoming events, i.e., Code-On, CSI, Arcano and Streak. Leads were assigned for these events, and event-specific groundwork were held. The secretary gave a much better clarity on how these events were executed in the past and any lessons to be taken from the failures, etc. Then the work was initiated. **The leads had to prepare the presentation with all the information regarding the event and its execution right from scratch.** We also tried to develop innovative ideas that could lead to the event's success. This phase helped us a lot in planning many things and getting an idea about the time requirement of an event. Apart from this, we also gained experience making presentations, which is one of the essential skills.

This part of tenure played a significant role in grooming the newly selected conveners and providing them with the proper skill set to contribute to the club better. The conveners thoroughly enjoyed the learning experience because the relatively easy deadlines gave enough time to learn. Also, the whole convener training was drafted in competition to keep the motivation of conveners high!

### Hoodie and T Shirt Design (December 2022)

The club's official hoodie for conveners and secretaries was also designed in this tenure. Leads were assigned to create virtual designs, communicate with the vendor, keep watch over the hoodie's quality and price, etc. The manufacture of the hoodies got completed in December and was shipped to either institute (for those residing in IITB) or conveners' homes. The design of Hoodie took a lot of time and effort from our side as it should be something that could motivate the conveners to do their best for the club.

# Upcoming Events

## Tech GC

We plan to conduct the Tech GC in the coming week. It would be held in collaboration with the Chemistry Club. The topic would dwell on the areas of healthcare and drug docking.

This would be a **low prep GC**, as it requires very little time and effort, and the enthuse for mid prep GC was relatively less among the students. The whole idea behind the GC is to highlight the fun behind chemistry and to help participants think practically about the pharmaceutical industry.

We would mostly be keeping one team per hostel, in the aim to attract people who have an interest in this domain.

## Freshie Orientation + Arcano

It is a two-round event organized exclusively for freshies. The first round will be a day-long crypt hunt organized on the D2C platform and was open to all freshies. 50 tricky and mind-boggling questions involving school-level biology concepts will be put before the teams.

The briefing session of this event will be held along with the BioX orientation, where all the rules were explained, and the queries of teams will be solved.

After Round 1, the top 6 teams were selected. Round 2 was even more interesting and fun-filled. It will have 2 parts; scribble round and buzzer round. 2nd round would be organised in LT.

## Talk with Dr. Siddarth Warrier (Neuroscience and upcoming biotechnology)

A talk has been planned with Dr Siddarth Warrier who is a well known podcaster-medical expert. The talk would revolve around research possibilities in neuroscience, and what next can we expect in the age of technology.

# MID-TERM REPORT

## ChemE TL

### Managers

Pulkit Jindal and  
Sumit Kumar

### Conveners

Bunty, Sristi, Kartik and  
Ramresh

2022

## Vision

To introduce and engage students with the topics of Chemical Engineering, thereby increasing the overall awareness and interest in Chemical Engineering.



Chemical Engineering Tinkerer's Laboratory, IIT Bombay

## Focus

To form a community that revolves around exploring concepts and experimenting with new ideas related to it.

## Goals

To enable students to engage in building high-quality projects, while removing the friction that students encounter during the process

## Inauguration Ceremony

On June 13, 2022, Cheme Tinkers' lab was officially opened with chief guests Shri Yogesh M. Kothari, Prof Ravindra D. Gudi, Prof Madhu Vinjamur, Prof Devang Khakhar, Prof M.M. Sharma. We hosted INAUGURATION CEREMONY attended by almost 150 guests in the VMCC Building. The primary goal of this ceremony Club is to promote students' awareness, to tell everyone about the aim and potential of the club and interest in chemical engineering generally.



## IIT Gandhinagar Tinkeract

2 student representatives of the lab visited IIT Gandhinagar and later we represented CETL in an online meeting of representatives of Tinkerers lab from colleges all over India.

We presented our thoughts and ideas and also got advice and feedback from other labs as to how to manage the lab and what problems to avoid.

## Publicity

### Instagram and Facebook post series as additional channels for publicity

- 1 post is released per week

#### • Histopedia

- Series of instagram posts on the history of chemistry and chemical engineering aimed to increase outreach of the lab

#### • Think About It

- Series of instagram posts on a variety of topics and experiments to increase outreach of lab and motivate students to tinker and create



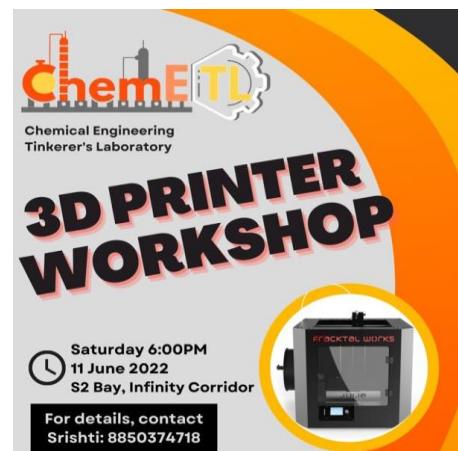
## Website Hosting

• A website has been created on github for students to explore and get regular updates of CETL events, access the inventory sheet, a blog version of Histopedia and Think About It thus improving outreach and footfall of events generate much needed traction for a new lab like ChemE TL

• It will also have dedicated pages for showcasing the projects being done in ChemE TL

## 3D Printing Workshop

We conducted a workshop to teach students how to use a 3D printer. This event was conducted to familiarize students with the working of a 3D printer so that they are motivated to try out projects of their own





## Egg Drop Challenge

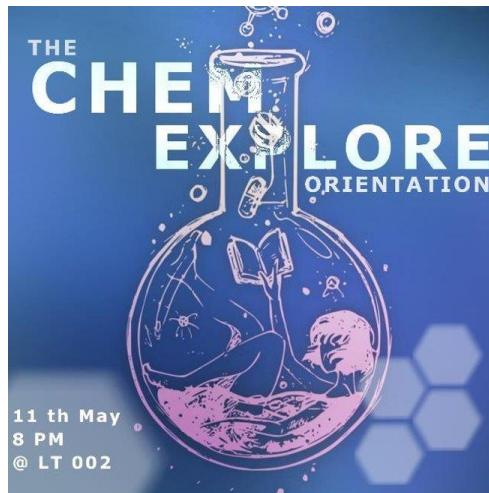
- The event tested out students creativity by challenging them to create a structure around an egg so that it survives being dropped from some height.

- The event was conducted to increase outreach and social media presence of the lab amongst students.

## Chemexplore

- A program oriented to help students in exploring chemical engineering and doing tinkering the field of chemical engineering.

- 10 projects are floated for students to choose and work
- Total 4 teams registered for the semester long projects consists of 22 students.
- 3 teams usefully submitted end term report of their projects.



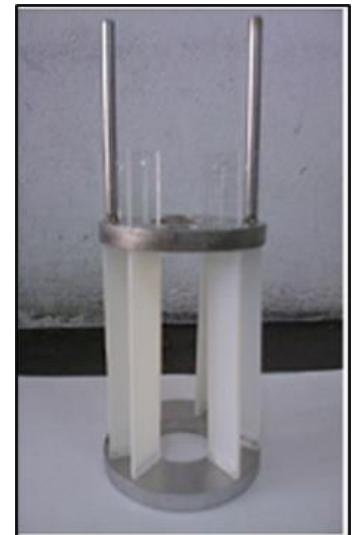
## Photocatalytic Water Purifier

- This Project would first involve learning concepts related to photocatalysis, such as the process mechanism, Reaction Pathways, and the knowledge of active species.
- Then there would be the development of the prototype model of the separator column containing horizontal trays in a honeycomb pattern and a photocatalyst.
- Then there would be various experiments with changes in multiple parameters, such as column length, water flow rate, etc., to modify the model's basic prototype.
- Impure water is poured over this column which gets purified in the effect of catalysis.

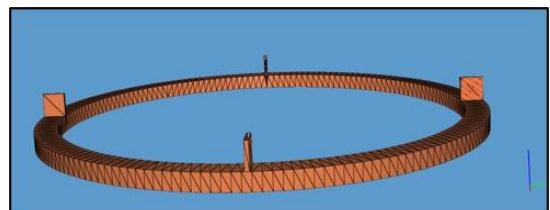
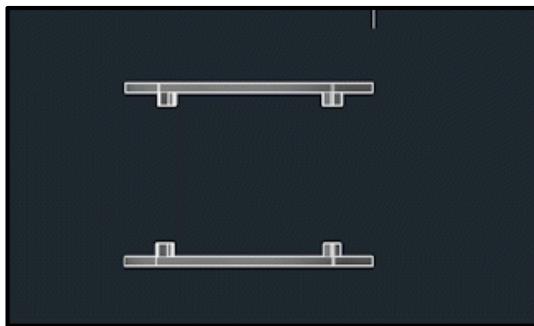
- The focus is on building an efficient industrial photocatalytic reactor model. We also need to keep track of parameters such as pH, temperature, oxygen concentration, and concentration of ion scavengers.
- There could also be scope for comparing various Metallic semiconductors and selecting the most efficient and economical one.

## Reactor Design Using 3D printing

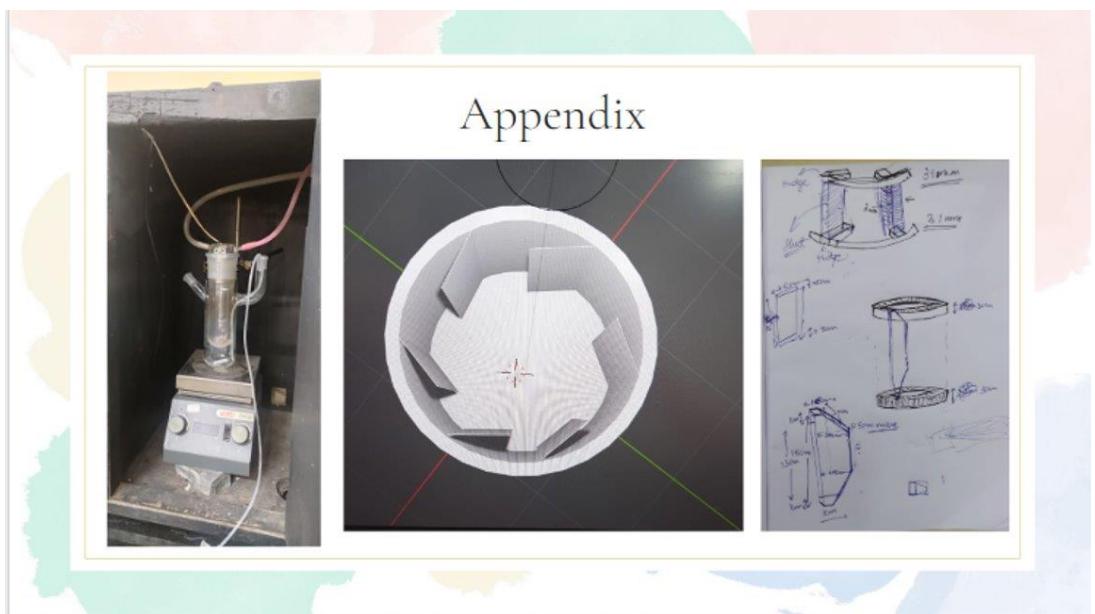
- Batch Reactor
- Coated strips placed at an angle to maximize the contact area of water along with UV exposure
- Setup is kept in a 2 L Beaker
- Dimensions :
  - Outer diameter of the rim =15 cm
  - Inner diameter = 13 cm
  - Sheet holder height = 2cm
  - Sheet holder width = 5mm
  - Sheet thickness = 3mm



A representative image for the reactor



## Appendix





## Water Quality Detection

- The current developments in the field of sensor networks are critical for environmental applications. Around 40% of deaths are caused due to contaminated water in the world.
- Hence, there is a necessity to ensure the supply of purified drinking water for the people both in cities and villages.

- Water Quality Monitoring (WQM) is a cost-effective and efficient system designed to monitor drinking water quality.
- In this report, the proposed system consists of several sensors to measure various parameters such as TDS value, pH value, turbidity in the water, level of water in the tank, temperature, and humidity of the surrounding atmosphere.
- And also, the Microcontroller Unit (MCU) is interfaced with these sensors and further processing is performed on a Personal Computer (PC).

## SLP Projects

- Launched this in previous semester, currently 3 teams of 2 Students are working on this.
- Credits will be there for SLP Projects.
- Mainly 3rd and 4th-year students are targeted.
- 2 semester-long projects. Projects will be floated by the faculty and the Ph.D. students of the affiliated faculty can mentor the projects.
- Students can also come up with projects and float them under this section.

## Future Plans

- We are focused to increase the students interest in chemical tinkering.
- Planned the events like ChemeNights (giving hands-on experience to students )
- Ideate Freshmen Orientation to introduce 1st year students with lab culture and lab facilities.
- Floated 10 projects under the banner of Reactorius.



## ChemE Nights

- We plan to hold this event where-in we provide demonstrations of chemical experiments and also provide some hands-on experience.
- This event will generate more interest in students to visit the lab and tinker .

## Freshmen Orientation

### Project Showcase

We are planning to showcase multiple projects in the orientation. 4 of these projects will be created by the conveners, the rest will be sourced from students, professors etc.

### DIY Kit

We plan on distributing a DIY kit to students which they can work on in groups of 3-4.

This would help pique students interest in tinkering and give them motivation to visit the lab to create their own projects

### Demonstration

We will demonstrate several fun experiments to the students that would leave a good impression of the lab and motivate them to carry out their own experiments.

## Industrial Talks

### The Plan

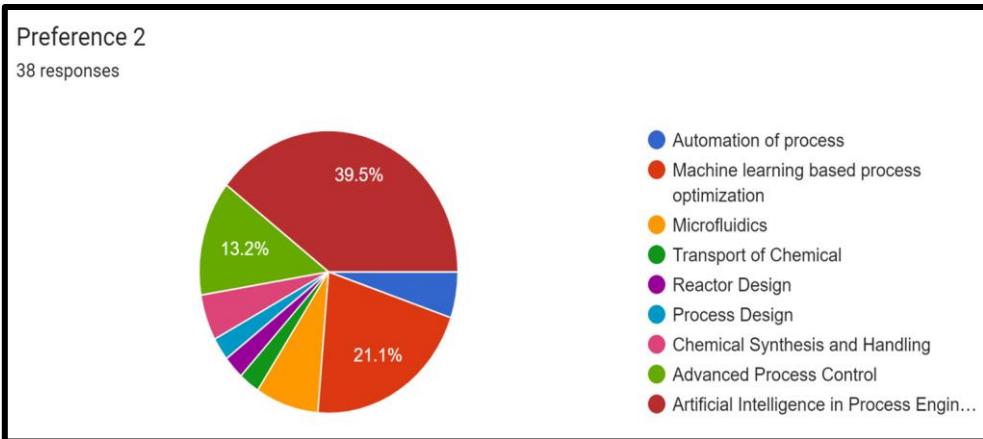
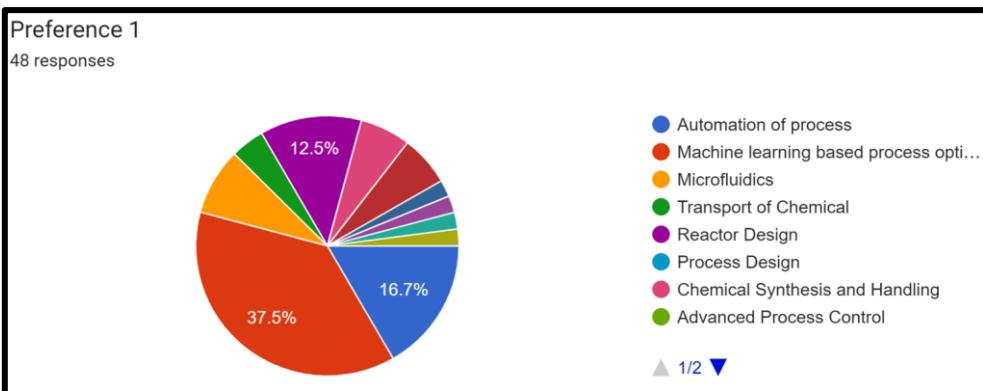
We are planning to invite eminent speakers in the emerging fields of Chemical Engineering to the institute to share their knowledge and stories so as to inspire students to explore chemical engineering. The talks would be based on a variety of topics and we will try to also make them interactive, with trivia quizzes, experimental demonstrations etc.

### Work to be done

We have created a Database of speakers to invite and have already started contacting them.

We plan to finalize the Logistics, Cost, Location etc. of these talks after the End-Semester Exams

## Survey results for the topics of Industrial Talk



## Reactorious

- List of projects were floated on 15th, October for the upcoming semester.
- More than 60+ students registered for the projects.
- One team requested to do his own project.
- Review of application and filtering of students for the various projects is going on.
- [https://drive.google.com/drive/folders/1XqhAE9SAVKByqbpnKYOf\\_IUf98t\\_BsdD?usp=sharing](https://drive.google.com/drive/folders/1XqhAE9SAVKByqbpnKYOf_IUf98t_BsdD?usp=sharing)
- <https://docs.google.com/spreadsheets/d/1MNbxoo3yKWAitjCbTx4CjWfRNA3fY6RLPOkyisxiyyM/edit?usp=sharing>

## Staffing and Lab timmings

- As ChemE TL grows we would need to recruit a full-time technician to oversee the functioning of the lab and its inventory, while assisting students in operating the equipment
- For now, we have arranged that the timings for one of the UG lab technicians be shifted so that he can oversee ChemE TL in its starting phase.
- Apart from this a manager from the student team would also be in the lab when the technician is not available
- Tentative Timings of the Lab:  
Weekdays: 2 pm – 8 pm | Weekends: 12 noon – 8 pm

# ChemE Enthusiasts' Group

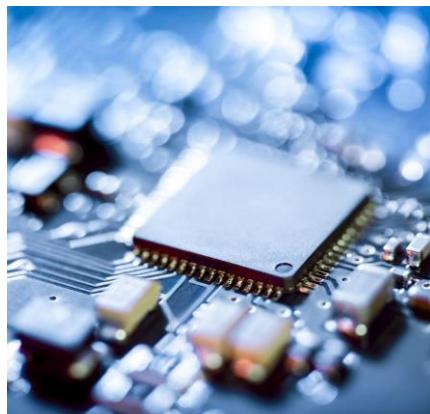
- The Core ChemE Enthusiasts Group is meant to be a community where interested undergraduates at IITB can interact with each other, their juniors, and their seniors
- The Group also serves to connect research and higher studies enthusiasts with alumni who have been admitted into programs of their choice around the world
- The Group can thus be a platform to discuss research ideas, as well as to get advice about how to pursue higher education

## The Need

We feel that a core community is necessary for the success of a student-centered club. While attempting to solve this, we found that there is a lack of a community for students interested in Chemical Engineering in our department. To solve this, we built this group, and we feel that it is a crucial piece which was missing in our department and that ChemE TL will benefit enormously from this.

## Areas of Focus

- Industry 4.0
- Yearly Themes
- Projects
  - Overview
  - Stages
  - Student Interest



## Closing Remarks

Thanks to you for your support.

We are at the initial steps of a long journey to fruition, and we hope to bring a change in the way ChemE is looked upon in the institute.

# MID-TERM REPORT

## Chemistry Club

**Managers**

Hiranmai Mohan and  
Aryan Gupta

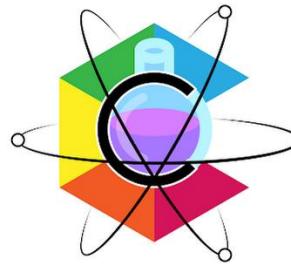
**Conveners**

Ashutosh, Bhumika, Neha  
and Shruti

2022

## INTRODUCTION

Chemistry Club was started in 2019 with an aim to make Chemistry, one of the basic and central sciences, more appealing to the general audience by conducting various events and activities which will give the audience, a fresh new insight into Chemistry, without bogging down into technical details/jargon, and more into the intellectually stimulating and exciting aspects of it. The club also aims to provide Chemistry enthusiasts, a community and platform of like minds, where their ideas and love for the subject can be shared to, as well be part of exciting opportunities which the club will bring about through its initiatives.



## EVENTS

### SoS Special Lectures (11th May 2022)

**(2022):** Conducted the first talk under this series titled 'Introduction to Drug Discovery' by Ayushi Verma, senior PhD student under Dr. Sanjeeva Srivastava in Proteomics Lab, Dept. Of Bioscience & Bioengineering at IITB. A hands on demonstration was also given by her.



### Workshop: (9th - 10th June 2022)

20 students from rural areas of Maharashtra were hosted under Prof. Arnab Dutta's guidance. The chemistry club coordinated the same with other clubs for extensive events. Our club conveners conducted the golden rain, water to wine to milkshake to beer, Oscillatory, chameleon and blue solution test reactions and organised interactions with olympiad medalists.



### Intellectual Property & Grants (15th Oct 2022) - Tech R&D Expo

The chemistry club organised a talk in collaboration with the American Chemical Society on Intellectual Property and Grants. The talk covered topics

such as applying for patents, the different types of patents and the legal procedures and loopholes in the process. This is an important topic to know for anyone wishing to pursue a career in STEM, especially for those interested in developing their own products/inventions.



## Winter School of Chemistry (4th Dec to 6th Jan 2022)

After a huge success last year, we successfully conducted the second edition of our PAN-India event, Winter School of Chemistry. This year we conducted it on a grander scale by scaling it up from 2 courses to 8 courses. We offered eight short crash courses on topics interdisciplinary fields of chemistry including biology, material science, chemical engineering and computation based this year:

Nanoparticle Synthesis and Characterisation, Re-refining in Petroleum, Numerical methods, Computational Chemistry, Introductory Biochemistry, Characterising Materials, Reaction Intermediates and Reaction Mechanisms and Carbon dioxide Capture, Utilisation and Sequestration technologies.

Seniors who were proficient in these fields conducted classes smoothly via online mode along with assignments, quizzes and projects. The mentors were carefully selected for the same and were asked to provide a detailed course outline.

Students starting from grade 9 were allowed to register with no upper cap for the age. We received over 1000+ registrations in total and 150+ registration per course from all over India and a few from abroad as well. These were spread over a wide range of ages and years of study, from grade 9 to doctoral and faculty members. We are currently finishing up the courses and working on final evaluations, which will be completed by mid-January, along with certificate distribution.

The image displays a 3x3 grid of promotional banners for various courses offered during the Winter School of Chemistry. Each banner includes the ITC logo, the course title, the course instructor's name, a QR code for registration, and contact numbers for Bhumiika and Shruti.

- WINTER SCHOOL OF CHEMISTRY**  
Course Instructor: Aryan Gupta  
QR code: [Scan to Register](#)  
Contact: BHUMIKA: 9604471593, SHRUTI: 9370883833
- CARBON DIOXIDE CAPTURE, UTILIZATION AND SEQUESTRATION TECHNOLOGIES**  
Course Instructor: Aryan Gupta  
QR code: [Scan to Register](#)  
Contact: BHUMIKA: 9604471593, SHRUTI: 9370883833
- Characterising Materials**  
Course Instructors: Hirnmai Mohan, Devashish Bhave  
QR code: [Scan to Register](#)  
Contact: BHUMIKA: 9604471593, SHRUTI: 9370883833
- REACTION INTERMEDIATE AND REACTION MECHANISM**  
Course Instructor: Lokesh Mahavar  
QR code: [Scan to Register](#)  
Contact: BHUMIKA: 9604471593, SHRUTI: 9370883833
- NANOPARTICLE SYNTHESIS, CHARACTERIZATION AND APPLICATIONS**  
Course Instructor: Samya Arora  
QR code: [Scan to Register](#)  
Contact: BHUMIKA: 9604471593, SHRUTI: 9370883833
- INTRODUCTORY BIOCHEMISTRY**  
Instructor: Tanirka Roy  
QR code: [Scan to Register](#)  
Contact: BHUMIKA: 9604471593, SHRUTI: 9370883833
- NUMERICAL METHODS**  
Course Instructor: Nishit Trivedi  
QR code: [Scan to Register](#)  
Contact: BHUMIKA: 9604471593, SHRUTI: 9370883833
- COMPUTATIONAL CHEMISTRY**  
Course Instructor: Reeshan Talukder  
QR code: [Scan to Register](#)  
Contact: BHUMIKA: 9604471593, SHRUTI: 9370883833
- Re refining in Petroleum**  
Course Instructor: Harish Kamble  
QR code: [Scan to Register](#)  
Contact: BHUMIKA: 9604471593, SHRUTI: 9370883833

## Technical GC

A technical GC planned as a collaboration between the Chemistry Club and BioX based on drug docking and biochemistry. The problem statement has been drafted in two parts and checked. It involves the chemistry aspects such as drug binding, pharmacokinetics and synthesis along with the utilisation of drug docking softwares such as Autodock Vina. Due to unavoidable clashes, the event is scheduled to take place in January.

## MISCELLANEOUS

### Inventory Setup

We have purchased a set of basic chemicals and equipment for the chemistry club to conduct experimental demos. The chemicals are currently being stored at ChemE-TL. Standard equipment includes burette, pipette, Erlenmeyer flasks and test tubes and chemicals include hydrochloric, nitric and sulphuric acids, indicators, sodium hydrogen carbonate, acetone, hydrogen peroxide, ethanol, isopropyl alcohol and glacial acetic acid. The inventory will be expanded further depending on the experiments to be performed.



### ACS Student Chapter

We started an international ACS student chapter for the club with the current six members (2 managers and 4 conveners)

Under the guidance of Prof. Arnab Dutta from the Chemistry department.

A grant of **300\$** has also been approved. This chapter integrates our club into a huge network of chemistry enthusiasts and professionals internationally.



## Chem-Tech Project

Some of the club members along with other enthusiastic students in the ITC are currently working on a project based on Carbon Capture, Utilisation and Storage under the guidance of Prof. Arnab Dutta. The objective is to build a device that can capture and sequestrate CO<sub>2</sub> at a domestic scale. A few more problem statements will be floated soon.

## Faculty Advisors

We onboarded Prof. Arnab Dutta, Prof. Amber Jain and Prof. Srinivasan Ramakrishnan from the chemistry department as our faculty advisors to guide us on various aspects including SIG, ACS, events and publicity opportunities and industrial and academic connections and networking. We have regular meetings with the professors to discuss the same.

## PUBLICITY AND OUTREACH

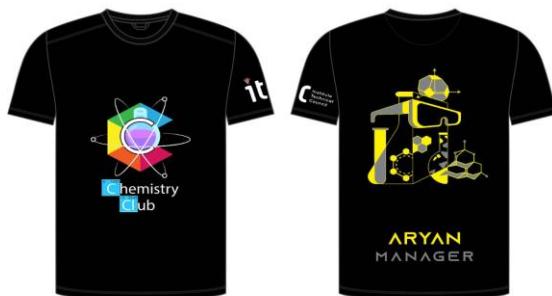
### Experiment Videos

We conducted fun experiments and uploaded short videos of them to our social media and had a reach of over 15k accounts on Instagram. This promotes interest in chemistry and offline experiments among the students.



### Club T-Shirt

We have designed and placed an order for T-Shirts for the current club members and our seniors.



### Lab to Lab Outreach

We reached out to the professors and talked to the students working in each lab, primarily masters and PhDs about our club and our initiatives and how they can participate and benefit from the same. We covered over 20 labs in each department including Chemistry, MEMS, BSBE and Chemical engineering.



## ACS Student Chapter Network

We have been in direct contact with ACS representatives via our student chapter. Publicity for our events such as Winter School of Chemistry is also done via their network, which comprises of chemistry clubs from other universities globally and ACS professionals. We are also in close contact with the well established ACS student chapter of Bombay School of Pharmacy and plans for collaborative events are ongoing.

## Chemistry Department Orientation

We introduced the chemistry club to the MS Freshers of the Chemistry Department and gave them an overview of the events planned for this year with a specific focus on SIG. We also showcased some of the ITSP projects during the session.



## Website

A basic draft has been created for the overall club website to integrate details about all our past and current events. It will be launched soon.

## Club Culture

Since we are a new club that functioned online most of the time, it is important for us to initiate few initiatives that becomes a fun traditions for the generation. We started with the 'Diwali Lunch' where all the members of the club were invited.

# MID-TERM REPORT

## Energy Club

**Managers**

Anokhi Mehta and  
Prathmesh Shimpi

**Conveners**

Hardi, Samiksha, Shantanu  
and Lucky

2022

# INTRO

The Energy Club is a student-led community of IIT Bombay. Our aim is to provide the energy enthusiasts community exposure to various aspects of energy through the events we conduct, bring awareness to the very prevalent issue of climate change, and look into new technologies in the energy sector.

## Initiatives and Activities throughout the year

### 1) Convener Selection and Team Building (May 2022)

Completed Groundworks with candidates (4 compulsory groundworks conducted) for 60 candidates, released assignments, conducted 15 interviews for shortlisted candidates, selected 4 conveners and announced results.

Manager in charge for scheduling groundworks and interviews - Prathmesh Shimpi Manager in charge for framing assignment, interview questions- Anokhi Mehta Team building activities and acquainting selected conveners with the Energy field- Prathmesh and Anokhi.

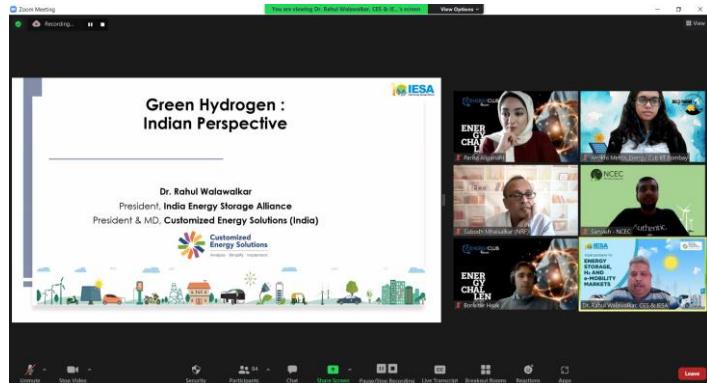
### 2) International Energy Symposium

The International Energy Symposium was conducted in collaboration with energy clubs of **TU Delft, Netherlands and NTU Singapore** on the 1st and 2nd June, 2022. The topics for panel discussion covered various aspects of energy ranging from hydrogen, green economics, smart grids and women in energy.

Large scale publicity for the symposium was carried out throughout May and speakers were finalised from a pool of professors, entrepreneurs and policy makers(IIT Bombay arranged 5 speakers)Received more than 320 registrations for the event, each session saw attendance of around 80 participants from all over the world.



Manager in-charge:  
Anokhi Mehta (work included coordination and ideation with partner universities, arranging speakers for the symposium, publicity in India, execution of the event)



### 3) Club Project

**FGC Salaam Bombay:** Energy Club mentored students of NGO Salaam Bombay to participate in FGC 2022 based on carbon capture and energy efficiency. The team, consisting of students from classes 9 to 12 were mentored by members of IIT Bombay's energy community and energy club council on ideation, problem identification, designing the solution and report making. The team successfully submitted their work for the first round on May 20, 2022. Certificates will be provided to mentors from Salaam Bombay

Coordinating with NGO- Anokhi Mehta

Recruiting Mentors and coordinating- Anokhi and Prathmesh

### 4) TSS Courses

Energy Club participated in the technical summer school in collaboration with career cell by offering two courses

- **Global Strategy, International Relations and Management:**

Energising Businesses and Economies: The course covered a broad overview of the global energy sector from a business as well as International Relations perspective and the impact of global politics and businesses in driving energy markets, investment and business strategies. Though centred around energy, the concepts learnt in this course are applicable across several industries.

- **Fundamentals of Energy: Foundation to a Sustainable Future:**

Foundation to explore the energy sector further. The course covered topics ranging from world energy scenarios, renewables, electric vehicles, storage sustainability, climate change, etc.

Both courses ran for 4 weeks, were self paced with regular assignments and quizzes to keep track of the participant's progress. They saw a registration of over 300 participants. The content was curated from various repositories, reports and video resources by the team and delivered to the participants on an interactive website and moodle.



#### Anokhi Mehta-

Course moderator (in charge of course structure, content curation, delivery, logistics and assesments)

#### Prathmesh Shimpি-

Posters and publicity to meet registration target



## 5) Akshay Urja Diwas

On the occasion of *Akshay Urja Diwas 2022*, Energy Club conducted an interactive workshop at Mahatma Education Society's Pillai College of Education and Research. The one and a half hour long interactive workshop aimed to sensitise more than 100 future teachers about the impact of consumerism on climate change and climate pedagogy.



The workshop covered the impact on the climate and energy consumption due to food habits, fast fashion, transport and single use plastic, focusing on sustainable solutions and the Circular Economy. It had various roleplays on climate conversations and interactive quizzes throughout.

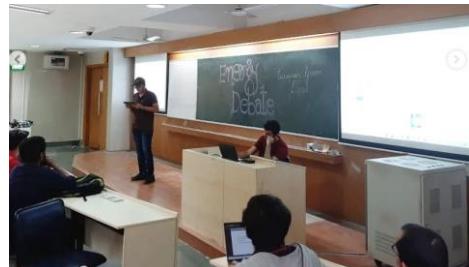
**Prathmesh Shimpi - Coordination**  
with Pillai College (staff and students),  
logistics, transportation, execution  
and prizes.

**Anokhi Mehta - Coordination** with  
Pillai College (staff and students),  
structuring and ideation of workshop  
content, content curation (content  
was created from scratch) and  
delegation, audience engagement,  
execution.



## 6) Energy Techno- Policy Debate- European Green Deal

We conducted our first offline debate on the "European Green Deal", focusing on the correctness of labelling investments in nuclear plants and natural gas projects as sustainable. The debate was followed by a healthy discussion amongst the participants. This event received a significant response from post graduate students as well. A new, solution focussed structure of debate was followed.



**Anokhi Mehta -**

In charge of structure of debate and problem statement, publicity, collaboration with Centre for Policy Studies council for outreach, conducting the debate



**Prathmesh -**

Coordinating with the debating society for providing adjudicator, room booking, prizes

## 7) EVTech- Market relevance, Technology Adoption and The Way Forward

An interactive session on "Electric Vehicle Technology" attended by 150+ students from IIT Bombay on 1st October, 2022. It was a complete EV ecosystem package that included market relevance, trajectory in India, batteries, software defined vehicles, services over the air, and firmware over the air systems taken by Mr. Anupam Bhattacharjee - Sr. Vice President, Tata Technologies. He shared his valuable insights and interacted with the audience to answer their questions.



Anokhi -

Ideation, speaker contacting and coordination, publicity, execution

Prathmesh -

Ideation, room booking, memento and refreshments for speaker



## 8) Interactive Session on Sustainable Transport

Energy Club was glad to host alumnus, Mr. Sushil Reddy at IITB on day 53 of his 6000 kms road journey along the Golden Quadrilateral on an Electric Car (MG Motor ZS EV 2022). He talked about the best practices to increase EV range, how to plan a long drive considering the EV charging stations, the developing EV infrastructure and showed us mechanics of EV (demonstration on his vehicle) and had a candid interaction with students.



He has been a part of various similar initiatives under the sunpedalride.com in various countries. He set the world record for the longest electric bicycle journey in India in 2016. This event was held in collaboration with the Energy Science and Engineering Department.

Coordination with department HOD and speaker, room booking, publicity -

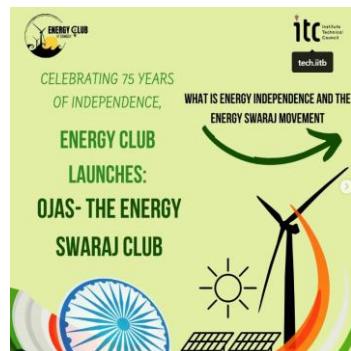
Anokhi

Execution- Prathmesh and Anokhi

## 9) Energy Swaraj Club

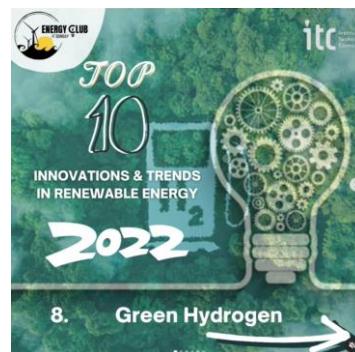
To celebrate 75 years of Independence we launched **Ojas-The Energy Swaraj Club** as part of Energy Club, IIT Bombay. The initiative works towards realising Energy Swaraj in India, ensuring Energy Security and Climate Change Mitigation under the guidance of Professor Chetan Solanki, the Solar Man of India and the Energy Swaraj Foundation.

Meeting and discussing with Energy swaraj Group, Drafting MoU- Prathmesh and Anokhi



## 10 ) Social Media

- Instagram page was reactivated through trivia quizzes and polls
- Infographics on interesting developments in energy were regularly posted on the page
- Instagram Series; Top 10 Innovations and Trends in Renewable Energy in 2022, highlighting major contributing areas in renewable energy and 2 prominent startups that emerged this year in each area... posted on the last 10 days of 2022
- Manager In charge - Anokhi



# MID-TERM REPORT

## Electronics & Robotics Club

### Managers

Sourabh Hanje and  
Tejas Amritkar

### Conveners

Annant, Kushal, Prasad,  
Pranjal, Anshika, Ayush,  
Nikhil and Aryan

2022

## 1. The Last Debug - 2nd May 2022

Like every year, TL and ERC held a joint Rukhsat for the graduating batch to honour their contributions to the Lab/club, ITC, and the tech community of IITB in general. The event saw an attendance of 18+ graduating seniors of TL and ERC. Fun activities, Senti sessions, mementos, and dinner were arranged.



## 2. Convener Selection : 7th May - 25th May

- **Groundworks:** 7 ERC-specific GWs were organized
- **Assignment:** 23 people submitted the assignment before the official deadline of 19th May.
- **Interviews:** 18 people were shortlisted for the interview, with 13 conducted in offline mode while five conducted in online mode
- **Results:** 8 conveners were selected, but results are yet to be announced due to the freshie midsems.



## 3. Code the Pixels: Image Processing Workshop - 19<sup>th</sup> June

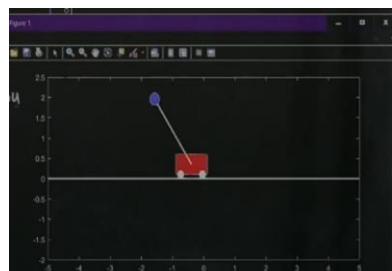


To kickstart the new tenure, ERC successfully organised its very first event, "Code The Pixels", on the 19th of June. The event walked the participants through the basic concepts of Image Processing and helped them learn various image and video manipulation techniques using the OpenCV library in Python.

*The event saw the participation of more than 80 enthusiastic students, out of which more than 50 students implemented the final project of Invisibility Cloak successfully.*

## 4. Control Theory Bootcamp - Summer 2022

This course covered the basics of control theory and its practical applications via software such as Pygame and MATLAB for modelling and simulating systems like Inverted pendulums, Line Follower bots, etc. The course was structured to enhance applications of the concepts covered through assignments. Doubt sessions were also conducted.



## 5. XLR8's Pre-Publi -

31<sup>st</sup> July

XLR8 pre offline pre-publi was done during Sophomore immersion. Two conveners stood in front of a crowd of thousands of students with posters in their hands. This attracted a large crowd, resulting in 550+ students participating in the competition.



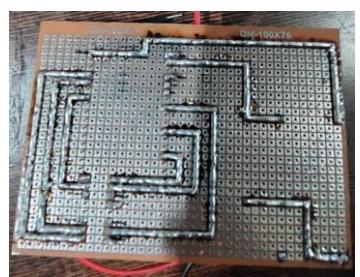
## 6. XLR8's Orientation - 5<sup>th</sup> August

With the theme of hot wheels, We conducted the orientation of our flagship event, XLR8. Everything was brought to knowledge from theory sessions to practical hands-on experience to the attendees and presented them the golden opportunity to learn and build their own WiFi - Controlled Bots from scratch.



## 7. Get Mechanised and Get Electrified Sessions

Get mechanized and electrified was conducted to guide the students to start building their own bots. This time it was conducted in two slots covering the same content to avoid overcrowding; hence, the understanding was much better. Get mechanized covered various types of motors, speed torque relationship, wheel size and diameter, which affect the bot's motion.



Get electrified and covered how the entire signal flows, starting from the android app right up to the motors. Each IC was explained in detail. Special focus was given to the modular understanding of the system and treating things as black boxes, which would help them in any technical work they do in the future.

## 8. Soldering Session

Soldering sessions were conducted for the students to make the task of soldering easy for them. Every team was asked to write their team names on the perforated board.



## 9. XLR8: Final Run

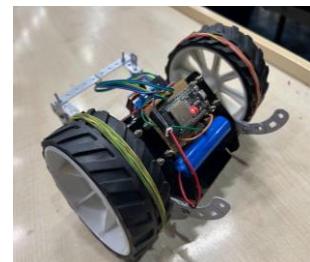
"Unity is strength, and great things may be accomplished through teamwork and collaboration."

The final competition was conducted in SOM Well. XLR8's final run concludes after a month of learning, building, designing, debugging and driving. The month was spent learning numerous technical concepts, practising collaboration and developing a technical attitude.

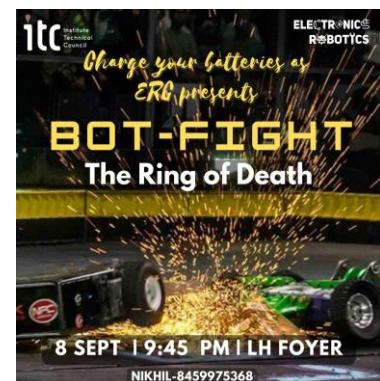


## 10. XLR8 Awards Distribution ceremony - 8<sup>th</sup> Sept.

XLR8 Awards distribution was conducted on 8th Sept. Awards were distributed based on the time of completion of the track and the number of obstacles completed by the team. 3 Awards were given based on this. 3 Design awards were given based on the creativity shown by the teams in the mechanical and electrical domains. Special mentions were given to some of the teams based on their design. Best Mentors were given to some of the students for their help in XLR8.



## 11. XLR8 Wrestlemania: Bot Fight - 8<sup>th</sup> Sept



## 12. PG Orientation -

PG Orientation was conducted to introduce PG new entrants to the world of Electronics and Robotics present inside the campus. It showcased some

cool projects made by IITB students and introduced them to all the events conducted in the tenure. The event showed a footfall of 100+ enthusiastic PGs.



### 13. Path Planning Workshop - 30th Oct.

Motion planning is one of the core problems in robotics, with applications ranging from navigation to manipulation in complex, cluttered environments. Path Planning workshop was aimed to empower the code of



intelligence which forms the basis of self-driving cars and autonomous robots. This workshop walked through the basic concepts of motion planning and the different algorithms used for implementation.

### 14. ERC's Hourly Builds: Fun Theory Workshop - 26 Nov

We showcased cool projects like Hexapod, Liquid Matrix display and much more. As a part of ERC's Hourly Builds, with minimalistic equipment and a bottomless barrel of skills to learn, participants made their own sound-reactive LEDs that sync to the background music.



### 15. The Frosty Winter - Winter 2022

We investigated problems by building smart robots that would be no less than Sherlock himself. Presented, A fROSty Winter. Participants used ROS, Gazebo and OpenCV to solve mysteries in this 4-week-long online workshop. Around 250+ students participated this time in fROSty WInter 2022. 2 assignments were given to the

students one in week 1 and one in week 3. 27 teams completed the first assignment.



### 16. XLR8 - Jan

XLR8 Jan is starting from 2nd Jan-2023 for freshers. ERC is conducting XLR8 two times in this tenure to get tech culture back on track in the institute. Doing XLR8 now will help freshers to do well in ITSP and their further tech-related competitions.

# MID-TERM REPORT

## Krittika The Astronomy Club

### Managers

Raksha Maheshwari and  
Advait Mehla

### Conveners

Shlesh, Apoorva,  
Anushika, Tamojeet,  
Mayank and Dhananjay

2022

## KSP 3.0

- KSP 3.0 comprised **six projects** that explored various aspects of astronomy and astrophysics through the means of theory, advanced data analysis, and animations with Python.
- Projects lasted over a period of two months with weekly meets with mentors and mentees
- These projects were open to anyone from any institute.
- Astronomy-enthusiast students of varying levels of expertise from multiple universities across several nations participated and made KSP a grand success. We saw over 110 applications and selected the top 30 for the projects.
- The project reports of each team will be available on our official website



## Stellar Flares

The project involved gaining an understanding of two existing methods of detecting solar flares from photon count data, the NOAA and Local Extrema algorithms and implementing them along with binning and smoothing of raw data, curve fitting and identifying two components of the flare. Thereafter potential issues with existing methods and possible improvements for the same were found out.

**STELLAR FLARES**  
Mentor: Ann, Devansh Jain  
8 Weeks | 4-5 Students  
Cosmic sources in the sky burst intermittently in the X-ray energy bands. The burst amplitude and the duration vary significantly. To detect such events, we have developed an automatic identification system. We'll also work on the data collected from Chandra and Swift Observatory's X-ray Solar Monitor to study the properties of solar flares and stellar flares in general.

Graph showing Count rate vs Time of day (s):  
Y-axis: Count rate (0 to 350)  
X-axis: Time of day (s) (0 to 80000). The graph shows several sharp peaks above the background level, with labels for 'Background + 3 σ', 'data', and 'Rare peaks'.

## Estimating Age of Cluster

The project involved extracting images of various globular clusters from PanSTARRS and performing PSF photometry on them to extract their apparent magnitudes in various passbands, followed by constructing their HR diagrams and fitting isochrones of globular clusters of differing ages and metallicities. Finally the best fit curves were identified and the age of cluster was estimated.

**ESTIMATING AGE OF A CLUSTER**  
Mentor: Harsh Kumar  
8 Weeks | 2-4 students  
Pre-requisites: How to estimate the age of cluster and perform data reduction (Photometry).  
The idea would be to take data from any public survey / GIT for any cluster. Then we have to perform photometry on the data and get the magnitude and get the color. With the help of color-color diagram, the age can be made, which eventually can be used to obtain the age of a cluster.

Learning Objectives:  
• Learn about standard photometric techniques in astronomy.  
• Learn how to reduce and process actual astronomical data and analyse it to make conclusions about the nature of clusters.  
• Learn how to fit isochrones of color-magnitude diagrams, HR diagrams and isochrone fitting.

Four student video feeds are shown in a grid.

## Galactic Simulations

The project involved numerical simulations of a large number of bodies under their common gravitational potential, as well as implementation of various algorithms to reduce computation while solving for large-scale structures. Galactic models such as Plummer and Dehnen density and algorithms such as Barnes-Hut were studied and simulated to obtain significant features of their evolution.

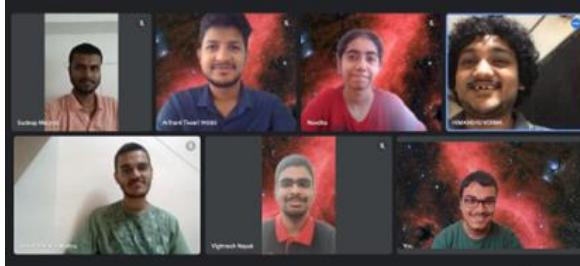
**GALAXY EVOLUTION THROUGH N-BODY SIMULATIONS**  
Mentor: Parth Sastry  
6 Weeks | 2-3 students  
It is generally believed that Spiral Galaxies evolve to form the old Elliptical Galaxies we see today. Recreating this timeline in simulations would be an exciting exercise in numerical simulation. We will start with a simple model on inside, the reason behind the stability of spiral galaxies is still a topic of active research, so we will try to see if it's possible to create a theory or solution resembling spiral galaxies.

Learning Objectives:  
• To gain an idea of how large scale simulations are carried out for astrophysics.  
• To be able to reproduce traditionally acknowledged timelines of galaxy evolution from spirals to ellipticals.

Four student video feeds are shown in a grid.

## Gaia Data Analysis

The project involved working with ADQL to extract data from Gaia (ESA spacecraft) and study various classes of stars, their physical properties and spatial distributions to arrive at results about stellar and galactic evolution. Star classes such as nearest stars, brightest stars, several open clusters, galactic centre and Large Magellanic Cloud were studied and HR diagrams constructed to find notable features in the constituent stars.



**KSP 3.0-KRITTIKA SUMMER PROJECTS** **10C**

**DECODING STELLAR PHYSICS HIDDEN IN GAIA DATA**

**Mentor: Himanshu Verma**

8 Weeks | 5 Students

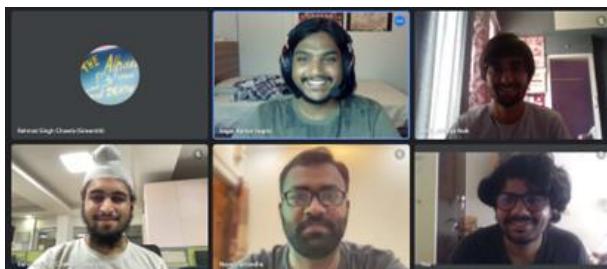
The project focuses on handling of Gaia data. We will start with learning to write a basic ADQL query to extract a sample of objects from the Gaia server. The extracted data will then be used in Python to analyze the data and study the properties of the sources in the Milky Way. We will divide these studies into three parts: (1) Selection: Selecting a specific subset of stars from the 1.5 billion data points. Building up interesting distributions of various physical quantities (2) Inference: Decoding various characteristics of the sources.

**Learning Objectives:**

- Handling of the Gaia data
- Analyzing the data using python to study the various properties of stellar abundance of the Milky Way.

## Gravitational Waves

The project involved using numerical methods to solve Einstein equations and model gravitational waves. Impact of orbital parameters such as mass, radius and eccentricity of the GW source on the resultant signal were identified and the corresponding waveforms were generated and compared with existing data.



**KSP 3.0-KRITTIKA SUMMER PROJECTS** **10C**

**GENERATING GRAVITATIONAL WAVEFORMS** using Numerical Relativity and Post Newtonian terms

**Mentor: Sagar Kumar Gupta**

8 Weeks | 6-8 Students  
Pre-requisites: Basic General Relativity

Signals from GW detector data need to be modelled to recover the source parameters of the detected GW. Although the presence of a signal can be confirmed by observing detections from the four current detectors, decoding the signal requires solving Einstein's equations. Their highly non-linear nature makes a numerical approach well suited. We will employ these methods to analyze how the GW source affects the signal.

**Learning Objectives:**

- How to make waveform models
- The way different parameters such as mass, eccentricity (and maybe spin) impact the GW signals.

Contact Us:  
Raksha | 9536890102  
Adwait | 9167147931

## Astro-physically accurate animations

The project involved learning the popular animation software, Blender, integrating it with Python and using it to create animations of various astrophysical phenomenon. Numerically accurate modelling and simulations done in Python were visually implemented on Blender to create striking renders of phenomenon such as black hole acceleration disks and black hole mergers generating gravitational waves

**KSP 3.0-KRITTIKA SUMMER PROJECTS** **10C**

**ASTROPHYSICALLY ACCURATE ANYMATIONS**

**Mentor: Aswin Suresh, Namita Agrawal**

8 Weeks | 8-10 Students

Ever wondered how the death star in Star Wars or the black hole in Interstellar was created? Take your first step to creating such effects by learning to model and rendering astrophysical simulations. We'll create 3D animations in Blender and model physically accurate systems such as stars, galaxies, and even small comets. Explore exciting physics from neutron star mergers to supernovae explosions to X-ray binaries.

**Learning Objectives:**

- Working on an astrophysical phenomenon
- Introduction to the Python API in Blender
- Using real life data to make physically accurate and stunning animations



## Stargazing Events

- Organised stargazing sessions for on-campus students
- Involved hands-on experience with Dobsonian telescope, Newtonian telescope, DSLR with tripod for long exposure, and binoculars. Attendees were shown various planets, clusters and nebulae.
- Electronically-assisted astronomy was used as a tool for the first time ever, showing extremely faint objects which are otherwise not visible to the naked eye.
- Two major events with roughly an audience of 150+ each time were organised in Gymkhana and OAT
- Attendees were given an introduction to the targets they viewed, including science, interesting facts and mythology.



## Solar Eclipse Event

- Organised solar eclipse viewing session for all on-campus residents for the 25th October partial eclipse, which was the only solar eclipse visible from most of India in the entire decade.
- Eclipse timings were just before sunset, between 4:50 and 6:10 pm with the maximum coverage of 36% around 5:40.
- Attendees were guided by the team on safely viewing the eclipse with glasses, as well as through the telescope and binoculars using solar filters.
- Witnessed an audience of over 250 students and staff members.
- Attendees were also encouraged to take pictures of the eclipse and share them on social media.



## Lecture on Transient Astronomy

- Was given by Prof. Varun Bhalerao from Physics dept IITB, and open to all IITB students.
- He talked about transients in the night sky, the international GROWTH collaboration as well as the telescope. He further spoke of his current research on detection of transients such as Gamma Ray Bursts from the AstroSat data, electromagnetic counterparts of gravitational waves and how students could contribute.
- Harsh Kumar, his PhD student also did a live demo of the working of GROWTH India telescope and obtained an image of Andromeda Galaxy from it.
- Had an audience of 100+ students



## Movie Screening

- Organised screening of the popular documentary *Apollo-13* at LT-PCSA
- Had an audience of 150+ students

## Computational Astronomy Bootcamp

- The CAB consisted of one week of Python training followed by month-long projects.
- Over 400 students of IITB were guided by club members over MS Teams with Python installation, programming basics and introduction to several libraries and their usage in scientific computing.
- This was followed by a selection assignment for three projects. We had over 60 applicants from IITB students and the top 30 were selected for the project

## Gravitational Simulations

The project involved numerically simulating objects at Lagrange points using Euler and RK integrators. Their time evolution and stabilities were studied for various starting configurations and values of the masses, and Poincare curves were plotted for the same.

## Detecting Solar Flares

The project involved using photon count data from Chandrayaan X-Ray solar monitor. Binning and smoothing using kernel convolutions were explored along with threshold setting for automated detection for the presence of flares in the data.

## Globular Clusters

The project involved extracting stellar data for globular clusters from the HUGS database, using those to construct HR diagrams, and curve fitting with main sequence isochrones. These were further used to conclude on the age and relative distance of the clusters.

ITC

## IIT Bombay Observatory

- We received confirmation of funding for the IIT Bombay Observatory under the IoE labs initiative at the start of the tenure, and commenced work on design, location and equipment for the same.
- After consulting the Space Committee and scouting many different locations we were given permission to use Hostel 14C 6th floor terrace for this facility by DD(AIA).
- We are currently working with Prof Varun Bhalerao and the Design Cell on designing a roll-off roof observatory and also obtaining quotations from various vendors.

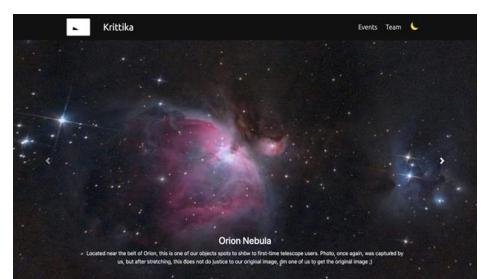
## Social Media

- Increased Instagram reach upto 1900+ followers.
- Content is posted 4-5 times a week, either through stories or posts
- Posts include a constellation series (Informative content about different constellations, complete with star maps and best observing times), past important events, as well as recent celestial phenomena and news, posts on Indian astronomy and interesting astronomy based memes and general trivia.
- A variety of interactive games are posted through stories such as multiple-choice questions, jumbled words, fill in the blanks, facts or myth, and winners get featured in the next story. Upcoming club events were also highlighted.



## Website

- Finished and fixed parts of the website created in previous tenures, rewrote it in typescript and next.js
- Hosted the website on Github Pages.
- Made it such that adding a blog post should be in markdown without writing any javascript code
- Here's a picture of the top of the home page:



## Inventory

- Purchased a 5 inch Newtonian astrophotography telescope to use with the new mount acquired in the previous tenure
- Made subsequent smaller purchases like a new laser, camera adapters, telescope bags
- Currently in the progress of purchasing another new telescope, an equatorial mount, camera for planetary imaging and a few other accessories.

# MID-TERM REPORT

## Maths & Physics Club

### Managers

Tharun Mahesh and  
Dhawal Singh

### Conveners

Shivangi, Madhav, Jainam,  
Vedika, Anand and Ameya

2022

## Introduction

The Maths and Physics Club of IIT Bombay is a community to celebrate the sciences we revere in their purest form, undiluted and in all their grandeur. We cater to stimulate your brains with the best intellectual events, quizzes, symposiums, lectures & to keep the streak of curiosity alive with knowledge by introducing you to labs in and off-campus with exquisite research work and setting you off to build your own experimental setups, funded by us!

The best fodder to develop oneself is a persevering thought process, our fortnightly group discussion sessions (popularly abbreviated to GDs) and exclusive documentary screenings leave you with ancillary knowledge and questions to let in those science-loving bees in your bonnet. And for those dulled by methodical cakewalk problems, we have a purely conceptual flagship quiz event, Bazingal, followed by our very own Mathathon (Maths Marathon) and Logic General Championship to the delight of connoisseurs of pure reason.

All in all, we are a self-sustaining community of intellectuals, students & professors, across ages and departments, who enjoy sharing knowledge through platforms provided by our club and if you talk Physics and Maths, there is no better place for you than the Maths and Physics Club!

Feel free to reach out to any of us anytime and join us on our journey!



## Summer of Science (SoS)

Summer of Science is an initiative started by the Maths and Physics Club with a handful of participants in 2016.

It is a one-to-one mentoring program, where we match enthusiasts who aspire to learn about a topic with student mentors with sufficient experience in the field. The topics ranged from Computer architecture, Chemical Kinetics and Cosmology to Robotics, Aerodynamics and even Abstract algebra. The participants were encouraged to submit a report of their learning at the end of the summer - the reports will be put up on the club website.

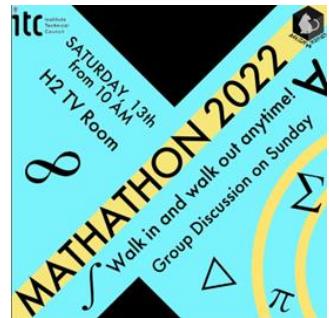
With over **1187 mentees and 250+ mentors**, Summer of Science 2022 was successfully launched on 13th May, continuing on its rapid expansion since it began six years ago. This time, in addition to reports, all participants were asked for 10 minute presentations expanding a particular subset of their SoS, and we are glad to report that we received **550 completions, compared to 360 last year in total**. Certificates were awarded to participants who submitted reports and presentations.

Event Description -

<http://mnp-club.github.io/blog/summer-of-science/>

## Mathathon

Mathathon 2022 was a math olympiad style walk in - walk out contest conducted by MnP. The most interesting feature was that we did not enforce any time restrictions! Participants could enter and leave the venue as they wished, and the only requirement we had was enthusiasm for solving hard math problems. Refreshments were also provided. The contest was simultaneously held online,



open to all students across various colleges in the country. The contest paper consisted of 3 rounds, the first round was objective with 10 problems, the second round required subjective solutions to 8 problems, and the 3rd round consisted of 4 subjective multi-part problems, each covering an independent area of mathematics.

The rounds were arranged in order of difficulty, but in-person participants could choose to attempt either round at any time, and the best solutions were awarded.

We held a group discussion about the problems of the contest on the next day. Various solutions and insights were shared, both by the problem creators and participants. The most elegant solutions were applauded, and at the end of the GD, the results of the in-person competition were announced, including the top 3 performers and special prizes for well written solutions.

[Link to QP: Mathathon 2022 QPs](#)

## SciComp Blitz GC



In collaboration with WnCC and Krittika, we held the SciComp Blitz GC based on the domains of Scientific Computing and Competitive Coding. Each club contributed 2 questions to the contest, and ours were based on computational fluid mechanics and Bell numbers.

About the event, it was held on the online platform, Hackerrank and participants were allowed to form teams of up to three people, each from the same hostel.

The details of the contest can be found here :  
<https://www.hackerrank.com/scicomp-blitz-gc-2022>

## SMMC (Simon Marais Mathematics Competition)

The Simon Marais Mathematics Competition is an annual university level mathematics competition held across 10 countries in the Asia-Pacific region. It has been called the 'Putnam of the East', such is its significance in the Mathematical world.



For the first time, we registered IITB into the competition and helped handle the logistics of the event along with Profs Rekha ma'am and Sudarshan sir, from the Maths Department, which included publicizing the event to all the Math lovers at IITB, accepting and managing their registrations and more.

IIT Bombay did incredibly well, finishing highest in the country and second overall in the East Division, securing ranks 4 and 8 in the Individual and Pairs categories respectively, with 10 pairs and 13 individuals in the first quartile.

## LogIQ

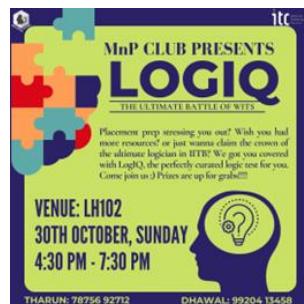


This was a pen-paper event with questions ranging from sequences, number theory, probability, and other topics based on logic. Participants had 2.5 hours to solve the contest paper, which consisted of 2 rounds.

Round 1 had 20 numerical type/ subjective questions, while Round 2 had 6 subjective questions. The questions in round 2 were on the harder side and had a good amount of thinking involved. The top 3 participants scoring the highest marks were awarded.

Link to

QP: [LogIQ\\_Questions.pdf](#)



## Sci-Fi Writing Competition



In collaboration with Literati, we conducted a Sci-Fi writing competition, an event where we gave out 4 different prompts, designed to kindle creative scientific and mathematical thinking. Our first prompt was on Leibniz, the second on seeing light beyond the visible spectrum, the third on alien civilisations and ending with a world with total certainty about microscopic particles.

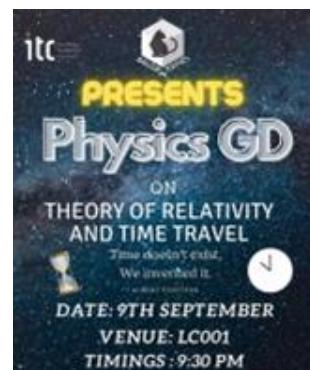
The submissions will be graded on the basis of creativity, adherence to the prompt and scientific consistency (as much as possible), with an estimate of 1000 words. Each prompt had a bonus element to it as well, which we gave out after a day.

## Student Talks (Discussions)

### Relativity and Time Travel

This GD was based on the fantastical ideas of paradoxes related to Special and General relativity. We went through a mind bending discussion on relativity of simultaneity and various examples of it. This talk delved into more seemingly straightforward concepts and how they can boggle minds if you stop to think about it. We touched upon the Twin Paradox, the Pole-Barn Paradox, and the Grandfather Paradox, eventually reaching Closed Timelike Curves.

[Link to the slides](#)



## Combinatorial Game Night



This Group discussion was about the general theory of combinatorial games. We wanted to describe precisely the conditions that make a game 'combinatorial' in nature. We then proceeded to classify games into impartial and partizan classes. We discussed an important theorem on the outcome class of impartial games. Then, we took a look at the specific games of NIM and Chomp, where we also covered the

interesting proof techniques. We also briefly touched on the game of HEX and its relation to topology. The Group Discussion was spontaneous and highly interactive, and the participants were circled around a whiteboard to encourage exchange of ideas.

## Fantasy Football

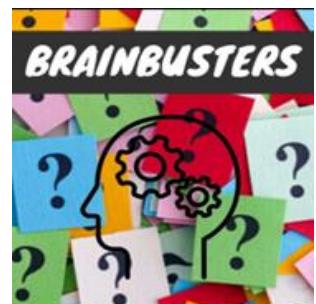
This GD was based on the different mathematical models and strategies that could be used, to have an edge in the game of Fantasy Football. Fantasy Football has become a very popular game in recent times and people have been enjoying it a lot. In this GD we started from the basics, discussing what Fantasy



Football is and what a Mathematical model is. We discussed the different strategies that could be employed for a game of fantasy football. We discussed the different parameters that can be studied and optimized. We took the inputs from the people who joined gd and tried making a strategy right there in the gd. It was a different concept and we enjoyed conducting it a lot!

## Miscellaneous

- We revamped our website and revived the website blog. Some of our social media initiatives include Brain Busters, #CKTCBSBIB, and various Instagram quizzes.
- **Brain Busters:** we posted stimulating logic-based questions once every month and featured the first solvers on our pages.
- **#CKTCBSBIB:** (which stands for "Curiosity killed the cat, but satisfaction brought it back") Here, we post a write-up on interesting maths and physics topics, along with articles for further reading.
- Along with that, we post small trivia questions on our social media stories, to keep the audience engaged.



# MID-TERM REPORT

## Tinkerers' Laboratory

**Managers**

Aniruddh Baranwal and  
Sharad Vishwakarma

**Conveners**

Hassan, Ashita, Tanmay,  
Abhijeet and Dewaansh

2022

## Overall Summary:

Over the last eight years, Tinkerers' Lab has emerged as a fundamental hub for all student-led technical activities. The 8,000+ students using the lab itself define the sizable and steady growth of the lab, with student beneficiaries including undergrads, postgrads, doctorate students, using the lab to date.

The lab's management structure continues to be student-driven, and the student council has put in place a system for smooth transition of control to successive batches of students.

The space for the lab has also doubled from 700 sq. to 1500 sq. ft and in the future will go up to 5000 sq. ft. when the lab shifts into the upcoming academic maker space at the Desai Sethi Centre for Entrepreneurship.

This tinkering facility at IITB is a place where students can come 24x7 to pursue their interest in Tech and work on their projects. We are grateful for the continuous support of the class of 1975 and 1966. The final trench of money came from the batch of 1966 which the MakersBhavan Foundation transferred to TL in 2019. Five successful start-ups have emerged from TL in the past 8+ years.

## TL Talks:

We conducted the first TL Talk of the year with Rahul Prajapat and his co-worker Sanjay Shekhawat. They were invited to take a session on "Tech Entrepreneurship in Germany." Rahul Prajapat is the co-founder of Tvarit GmbH, and his company is working on reducing the number of rejections in metal manufacturing processes with the help of sensors and ML.



Starting with his unique entrepreneurial journey in Germany, he explained about his business model and what his company is trying to achieve in the long term. He also enlightened us with his views about how to proceed in technical entrepreneurship in general.

He talked about digitalization processes, his company's AI models which are helping factories save tonnes of money and the methods which they use to optimize manufacturing. We also got insights on how to find a team and why it is necessary to have a good one. Overall the session was very interactive and a really great experience. We thank them for their time.



## Just Make It:

A webinar series conducted in collaboration with MakersBhavan Foundation. Two such sessions were conducted, in these session, our host Ajay Lavakare, Director of [TinkerTech Lab](#), and a founding member & past Co-President of [Stanford Angels](#) & Entrepreneurs India was in conversation with Rohildev, Founder & CEO-Tech, [Nimo Planet Inc](#) who walked us through his entrepreneurial journey - from the origin of his idea to raising money to design and manufacturing of the product, to taking it to the market and Radhika who is the co-founder and CEO of Cradlewise, a baby tech startup headquartered in San Francisco.

Her expertise lies in connected hardware, product and marketing. She has a masters degree in Electronics Design from the Indian Institute of Science, Bangalore. She worked in the semiconductor industry before starting up on her own. She took us through her journey in the session and gave insights on how one can enter the vast and ever expanding field of tech entrepreneurship.



## Let's Think Reverse:

We hosted an amazing event with Mr. Sandeep Nair On 2 October 2022, a natural tinkerer who loves to reverse engineer stuff in his free time. He was invited to discuss reverse engineering and design thinking.

In the session he had covered various topics including design thinking, monetization of technical assets, IP rights in India/US, and role of analyst followed by practical demonstrations where he disassembled an OTG oven. He ended the session with an enthralling show using an electric plasma arc generating device. We had a great response with 50+ undergraduates, postgraduates and PhD students joining the session. The session was a part of the PG Tech Weekend.

## Social Media:

We launched a new LinkedIn page, and it has been an invaluable resource for us in terms of increasing our visibility and reaching a wider audience. By sharing updates, we've been able to engage with tinkerers around the professional space, and showcase the value that we offer. Overall, our LinkedIn page has been an effective platform for us to connect with others in the field.



## Tinkering Bootcamp:

This summer, Tinkerers' Laboratory ran the 'Tinkering Bootcamp,' an online course designed to give students the skills and knowledge they need to succeed in the rapidly-evolving world of technology. The 4-week Bootcamp was structured as a technical summer school, offering a range of live sessions covering a wide variety of topics, including Arduino, ESP32 IoT, Raspberry Pi, and SolidWorks.

These sessions were conducted by the conveners and featured demos and hands-on exercises to help students learn by doing. In addition to the live sessions, students were also given assignments and projects every week to help them apply what they had learned and test their skills. Overall, the Tinkering Bootcamp was a valuable opportunity for students to learn from experts and gain practical experience in a supportive and engaging online environment. The course was attended by more than 200 students out of which more than 150 students completed the course and 6 students completed the course project.



## Infrastructure:

A lot of infrastructure at TL which had degraded over the past 3 years was improved. Tables, cupboards, etc were fixed. A new board outside TL (like the ones present in front of the department buildings) was also installed for better visibility. This has improved TL's usability and helped in making it more visible to students of IITB. A wall painting was also done by students to make TL more lively. New posters were also made to guide students while using TL as the older posters had degraded over the past 3 years. We are in the final stages of buying two new CPUs with GPU capability to replace the aging computers currently present in TL. They will vastly improve the experience of students working in TL since the old computers were very slow.

## MS 101 Course:

A new course was introduced by IITB for freshmen this year. TL collaborated with the academic section and professors to start the course. We helped in structuring the course, changing the final aspects of the course according to feedback from various stakeholders and finding qualified teaching assistants so that the freshmen do not face any difficulties in completing the course. We are also in contact with freshmen to help them connect to seniors who can help them to clarify and implement the things which they are learning.

## Alumni Visits:

We organized alumni visits especially for the alumni of 1971 and 1997 batches. A lot of alumni from diverse fields came to TL and talked to students to give them guidance. We showed them around and told them about the projects which are facilitated by TL. Around 8 alumni came from the 1971 batch while 15 alumni came from the 1997 batch.



## TL Website:

We made a website to act as a publicity platform for people outside IITB. It has been completely designed and implemented and will be hosted in January. It has information about the work done, events organized and machines present.

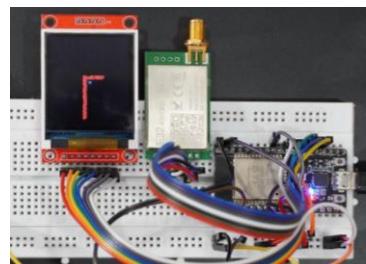


## Long Term Projects:

5 projects were floated in collaboration with alumni of IITB. Currently, 2 of those projects are being completed by student teams. One of the projects aims at making a highly efficient windmill by drastically changing the design from the currently popular horizontal axle design to a vertical axle design. Another project involves using coal liquefaction to generate oil which can be later used to generate hydrocarbons like crude oil. Both projects have completed literature review and will now work on the prototype.

## Invention Factory:

It was a program by MakersBhavan Foundation, the parent body of Tinkerers' Laboratory which was promoted in the IIT Bombay Campus by Tinkerers' Lab. The Lab served as a prototyping ground for the teams, where students from across 24 IITs utilized the lab for building models for their innovations. Four of the ten teams completely made their prototypes in the lab while the other teams used the lab throughout the program due to easy and unconstrained access.



## Eureka Science Centre:

Over 60 students from all over Maharashtra and Goa had come to visit Tinkerers' Lab. We showed them the lab and explained the various machines which we have. We also showed the various projects that students were working on during that time. Overall, the visit was a great learning experience for them and they got to know a lot about the prototyping machines that we have in TL.

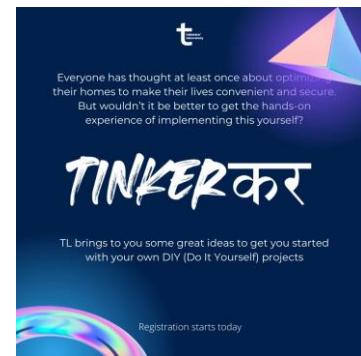


## ITSP 2022:

TL was involved in helping the students learn how to use the various machines which we have. We took sessions for them to help them understand how and when to use the machines and organized sessions on various softwares like SolidWorks, Eagle, etc. We also helped them acquire things which they needed immediately so that their projects do not get delayed. Furthermore, many students worked in TL during the summer holidays to complete their projects.

## Tinkerकर-DIY 2022 (Ongoing):

Tinkerers' Laboratory put forward a program to encourage students to develop hardware projects. The projects were kept moderately tough yet fun for the students. They were designed to require minimal hardware resources and coding. It was targeted to beginners and students who wanted to gain experience working with low-cost hardware like basic electronics, Arduinos and ESPs. More than 300 students and 50 mentors applied.



## Work Distribution :

Aniruddh Baranwal	Sharad Vishwakarma
Just Make It	TL Talks
Website	Social Media
Let's Think Reverse	Infrastructure
Tinkering Bootcamp	Tinkering Bootcamp
Long Term Project	Alum Visits
ITSP	Invention Factory
Eureka Visit	Eureka Visit
DIY	DIY

# MID-TERM REPORT

## Web & Coding Club

### Managers

Ishit Garg and  
Shreedhar Malpani

### Conveners

Navyansh, Parth, Shrey,  
Aryan Goyal, Aryan  
Bhosale, Atishay,  
Chaitanya & Soutrik

2022

## 1. Seasons of Code

In the 7th edition of SoC, we witnessed our highest ever participation count.

We received an overwhelming 71 projects mentored by 100+ senior students.

This year we had projects in a multitude of domains, ranging from Web and App Development, to Machine, Deep and Reinforcement Learning to miscellaneous projects on Quantum Computing, Image Rendering etc. A total of 500+ students were selected for these projects, out of which 200+ applicants were successfully able to complete their projects.



## 2. Roadmaps

This year the club started a series of blogs, "Roadmaps: Dream Interns", featuring seniors who had successfully interned at firms we all wish to end up at one day. Featured interns:

Laxman Desai : Product Intern - Sprinklr

Kunind Sahu : Analyst Intern - American Express

Their stories came to life to inspire us as they imparted tips, tricks and general counsel to ace the internship season. They also discussed what got them hooked to coding, what made them stay, and how they evolved through the process.

## 3. Internship Prep Session

The club organized the Internship Preparation Session with a viewership of 200+ students to help prepare students for profiles in IT/Software.

We had 5 speakers:

Sahasra Ranjan : Rubrik

Deven Bansal : Microsoft

Dlyvanshi Kamra : Google

Naman Chanduka : Optiver

Shruti Singh : Honeywell



They spoke about how to ace intern tests and how to make a good impression in the following interviews leading to the intern. The session helped students to get their queries answered from their amazing seniors.

Also an updated DSA preparation booklet was released.

## 4. Tech Sessions

**Sessions on Database Management Systems, Operating Systems, Computer Networks and Object Oriented Programming** taken by Rajat Jain, a 2022 IIT-B graduate currently working at Quadeye. These are some of the important topics for software profile interviews.

He brought to the table his innate understanding of the subject matter along with industry experience on the same.



## 5. Learners' Space

Under Learners' Space, the club conducted

2 courses:

**Introduction to Blockchain,**

**Introduction to Web Development: React and Next.js**

These were taken by the conveners and received stellar reviews. More than 500 students enrolled for each of these courses. They provided resources and even indulged in online meetings to stay connected with students over the summer. We got amazing feedback from most of the students who registered for the courses.



## 6. Blockchain Session

Presided over by Mr Seetharam, an engineering manager at Marsh McLennan, these sessions aimed to preserve the blockchain culture at the institute. This session was hosted in collaboration with Marsh McLennan. He spoke extensively on:  
Decentralized Finance  
Public and Private Blockchain

The event was a success and we had over 150 students attend the session.

Even after the session had officially ended, the speaker engaged in some insightful discussions with some of the highly enthusiastic attendees.



## 7. Reflections

A revival of the club's well-liked discussion and interaction series, "Reflections". Attendees learnt about internships and coding at large tech companies from Ankit Jain, a senior undergrad from the CSE department who interned at Rubrik, USA. The talk was held in the Hostel 9 TV Room.

Ankit Jain gave a high-level overview of his project during his stint as a software engineering intern at Rubrik. He also discussed how software engineering jobs vary from the traditional Institute level software projects.



## 8. Debriefing Data

Under PG Tech Weekend 2.0, WnCC conducted Debriefing Data, an event to look into the theme of Exploratory Data Analysis. We covered essential libraries like NumPy, Pandas and Matplotlib. This was followed by a hands-on activity where students had to employ their acquired skills. More than 200 students attended this session and the session was highly interactive.



## 9. Placement Prep Session

Amid the pre-placement talks, the club organized the Placement Preparation Program for IT/Software in collaboration with Career Cell. Attendees learnt what exactly is in this domain and how to prepare for it.

The speakers were:

Parth Laturia : Quant Associate, Morgan Stanley

Naman Nahar : Software Engineer, Google

Gagan Jain : Data Scientist, Google

The session helped students to prepare more effectively for the gruesome placement season ahead.



## 10. SciCompBlitz GC

The first Tech GC, SciComp Blitz was held in collaboration with MnP club and Krittika. Coders and science enthusiasts teamed up to represent their hostel and to attain glory. It was a competitive coding competition based on Scientific Computing, where one had to solve complex math, physics and astronomy problems that would've been a nightmare to do by hand.



This was the first GC of the season and saw enormous participation from each hostel with nearly 50 teams participating from each hostel in the institute.

## 11. Blockchain Mania Hackathon with Analytics Club

After the intern season, we collaborated with the Analytics Club to conduct Blockchain Mania Hackathon. Hands-on training sessions were conducted where students learnt how to code smart contracts and deploy them.



After the training sessions were organized, the hacking period was officially started where students were expected to build and come up with innovative web3 based decentralized projects. Cash prizes worth INR 40,000 were distributed to the winners of the hackathon.

## 12. Website Revamp

The website was updated this year with a new team section and the production build was shifted to the ITC Gymkhana servers which were previously hosted on digital ocean containers. Some minor bugs were also fixed and Roadmaps by our skilled seniors of IIT Bombay were added in the Code::Blogs section of the website.

## 13. In Case You Didn't Know

A series of Instagram posts which aimed to raise awareness and answer some basic, interesting questions we never knew we had. These posts help people to understand some technical computer concepts with great ease. Popular posts include:

1. What is a Captcha?
2. How do internet cookies work?
3. What is Web3.0?
4. Tesla Autopilot
5. What are 01 Bit-Flips?



## 14. Git & Git-hub Session

With Hello FOSS just around the corner, we hoped to get the rhythm going with our GIT/GITHUB Session to initiate viewers on their journey to open-source.

Hosted by our seniors:

1. Divyansh Natani
2. Vibhav Aggarwal



They spoke about version control and conducted a workshop where all had to follow together on their PCs and learn some advanced concepts of github by coding along with WnCC Conveners had also prepared a fungame using github based on the theme of World War 2. This game helped the attendees to enjoy the session even more and implement what they had just learnt during the session.

## 15. A Closer Look Into Open Source

The session was an introduction to the idea of open source contributions and the anecdotes of those who made contributions in Google's Summer of Code.

Our Speakers were:

1. Tirthankar Mazumdar: GSOC '22 with CERN-HSF
2. Siddharth Mundhra: GSOC '21 with SymPy



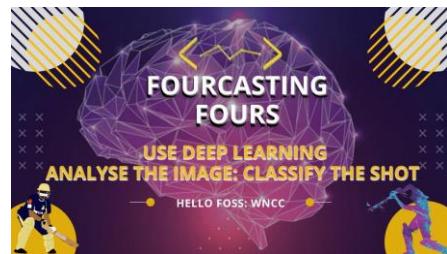
The speakers talked about their GSOC experience and guided the attendees with the GSOC application process and the right way to enter the world of open source programming through various open source competitions and summer events.

## 16. Hello FOSS

To foster the open source culture on campus, the club conducted Hello FOSS. The perfect way to get started on the journey to more prestigious events like GSoC and HacktoberFest. We did not want previous knowledge to be a barrier so we also shared critical resources required to get started.

Active Contributors got shoutouts on our social channels. Our projects included:

- Birds in Rage: Game Dev using Pygame
- Fourcasting Fours: Deep Learning
- Gr-affable: Data Structures and Algorithms and Graph Theory
- Time Capsule: Full stack decentralized app



## 17. Blockchain Workshop

This workshop was organized just before Solana Developers' India Tour to kickstart the web3.0 programming journey of the students of IIT Bombay. This was open to all and was taken up by Laxman Desai, 4th year undergrad of Chemical Engineering IIT Bombay.

Laxman Desai introduced some basic concepts of React JS and Solidity and then programmed a fully decentralized tweet sharing app on React JS and Solidity. Students were expected to code along and develop their own application. We got a positive feedback from the attendees of the session.



## 18. Solana Developers' India Tour

In collaboration with Solana, WnCC organized the Solana Developers' India Tour. Held in the lecture auditorium, we welcomed guests from outside the institute to attend the event which was hosted by speakers from Solana. It was a 6-hour workshop where attendees were made familiar with javascript and rust and the basics of a blockchain.

Lunch was provided to the attendees of the session and we were able to retain 80% of the attendees post lunch, despite being a 6 hour long workshop.

## 19. Social Media Handles and Outreach

All the events, updates and upcoming competitions conducted by the club were communicated through Instagram and Facebook posts. As mentioned above the In Case You Didn't Know Series was continued.

## 20. WebDev Bootcamp

In collaboration with Zuitt, the club organized the Web Development Bootcamp with courses on Front-End, Back-End and Full Stack Web Development - JS Stack along with a short course on Data Structures and Algorithms. Web development is a beginner friendly domain that comes under software development and Data Structures and Algorithms knowledge is required for cracking most of the software engineering interviews.

## Upcoming Events

### 1. Codewars

Codewars is our annual flagship event which involves strategy planning and programming to defeat the opponent's territory using the power of programming.

The conveners are currently working on the development of Codewars' Game Engine.

### 2. Codegames

Codegames is an annual competitive programming competition which helps us to keep the Institute's CP culture intact. This year we plan to organize Codegames in an offline setting with varying levels of difficulty.

### 3. Freshers' Orientation

To induce the freshmen into their college life, the club conducts the Freshmen Orientation where the power of coding is displayed pompously.

Apart from these, we plan to organize a few more exciting events in the upcoming semester which are yet to be finalized and formalized.

## Work Distribution

**Ishit and Shreedhar-** SOC, Roadmaps, Internship Prep Session, Tech Session, Learner's space, Roadmaps, Blockchain Workshop, Solana Dev Tour, Hello FOSS, A Close Look into open source, Git/Github Session, In Case you Didn't Know, Social Media Outreach, Reflections, Blockchain Mania Hackathon with Analytics Club

**Ishit-** Blockchain Sessions, SciComp Blitz GC, Website Revamp

**Shreedhar-** Data Debriefing, Placement Prep Session, Web Dev Bootcamp

# MID-TERM REPORT

## Design Team

**Manager**  
Anubhab Ray

**Conveners**  
Nupur and Joshitha

2022

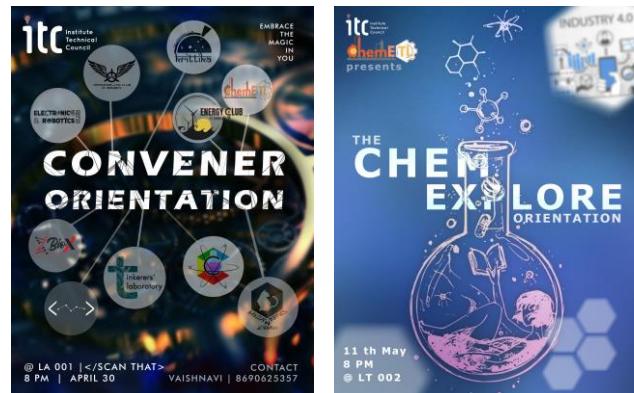
## Overview

We at the Design Team of ITC are committed to create awesome graphic content for any Club under ITC or ITC as a whole. Taking responsibility for creating posters, banners, brochures, flexes, tshirts, hoodies, etc. we make sure that proper publicity (both offline and online) is done in due time. Closely collaborating with the media team to keep the ITC social media handles up-to-date and keep the flow of new content (Pre-Event posters and Post-Event pictures/after-shots).

Following is a detailed account of the monthly work done :

### May 2022

The tenure hasn't started yet. Work was done on ChemExplore Poster (ChemETL), AIR Show 2k22 poster (Aeromodelling) and making/organising/collaborating with slides for Convener orientation. Convener selection and training process.



### June 2022

Conveners selected. 1st group work was a Wall-Painting in ChemE TL, a collaboration of many people. Then ChemE TL inaugural posters/banners and a t-shirt for them. Then ERC Club's Image-Vision workshop poster.

**Work distribution :**  
wall-painting by everyone,  
t-shirt by Nupur, ChemETL  
poster by Anubhab & ERC  
poster by Joshita.



## July 2022

2 IxT (Industry x Tech Event) posters - equally distributed by Anubhab & Nupur. ChemETL SLP info session poster (by Joshita) and Fun-Activity (Egg Challenge) Poster (by Anubhab).



## August 2022

Poster on CSEC Guest-Talk event. Then, came PG tech orientation, a poster was made keeping it eye-catching and effective in conveying the required information. A Presentation was designed with suitable graphics and typography to explain the working and importance of each club of ITC. T-shirts were developed for the same to be given as freebies during the event.

A combined Poster was made for GC-Opening, ITSP and ITA and later the "Tech++" t-shirts were re-designed for the same.

To launch Founders' Garage in the same PG Tech Oreo, a poster was designed for all social media Platforms.

Work distribution : CSEC poster by Nupur, PG Tech poster by Anubhab, presentation was by Joshita, both the PG-Oreo and Tech++ t-shirts were by Nupur, the combined poster by Anubhab and Founders' Garage poster by Anubhab.



## September 2022

First the InstiX Logo was designed keeping in mind the simplicity and uniqueness of it.

Then came PG Tech weekend, for which 4 posters were designed. Then SciCompBlitz GC Poster was made.

The work of creating team posters had started and in total 10 club posters, 3 supporting body posters and 1 overall-core-team poster were designed. They were then put up on all social media handles of ITC to publicise the entire Technical Council of 2022.

Then the RnD preparation started, for which first the Logo was designed.

Simultaneous events like ERC Xlr8 went by, in which we created posters and after-shots for instagram, fb, etc. Also Inter-IIT CL & Core Team selection Poster for Instagram was created.

Then Midsems came for Sep 14 to 20.

**Work Distribution :** InstiX Logo by Nupur, PG Tech Weekend 4 posters by Joshita, SciCompBlitz GC poster and all team posters by Anubhab, RnD logo by Nupur, ERC video/insta-album thumbnail by Nupur and InterIIT CL poster was by Joshita.



## October 2022

Work started with the ERC t-shirt, then we finished the ITC hoodie after many theme changes and testing different colour schemes.

The RnD Expo was on 15-16 Oct, and it marked the time of huge work from the Design Team. We created multiple Flexes, Posters, Standees and the Brochure. Id-Cards, t-shirts, FunZone flexes, Stickers and the Photo-booth were also made. There were many event posters related to Talks and Workshops. There was post-event publicity on all social media handles, where we designed the thumbnail covers. And were post-event Testimony of important Guests who visited the Expo.

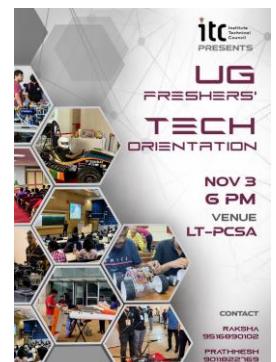
**Work Distribution :** ERC t-shirt by Nupur, ITC hoodie by Anubhab, Flexes, Posters, Brochure by Anubhab. Standees by Nupur. Id-Cards, t-shirts and stickers were by Joshita. Individual Event posters by Joshita and Nupur. Thumbnail covers by Joshita. Testimony by Anubhab.



## November 2022

For Freshie Orientation we designed the poster and collaborated in a combined presentation. Fun-activity with fluorescence powder (ChemE TL initiative) required some designs to be made at the site.

Work done for Tech-Points portal's User guide (an Instagram Carousel). Then started tshirt and hoodie work for the Energy Club. Then EndSem started from Nov 11 till 20th.



**Work Distribution :** Freshie Oreo poster by all. Presentation help by Joshita. Fun-activity work by Nupur. Tech-points portal work by Nupur. T-shirt and hoodie work by Anubhab.



## December 2022

With vacations going on, the Design Team created the Chemistry club t-shirt, the modified Energy Club hoodie and t-shirt. Also completed the CSEC hoodie.

Side-works like creating thumbnails for Freshie-Intro video with the Media team.

Inter-IIT CLs have been selected and 4 PS were launched, so their respective posters for Instagrams, fb, etc. Then the Inter-IIT hoodie (draft) was designed.

Also ERC hoodie and 2 standees for Winter-School-of-Chemistry and Rascionix each were designed for the Chemistry Club. And at last, compilation of all mid-term work reports.

**Work Distribution :** Chemistry Club t-shirt, Energy hoodie by Anubhab. Energy t-shirt by Joshita. CSEC hoodie by Nupur. Thumbnail for Media team by Joshita. 4 PS posters by Anubhab. Inter-IIT hoodie by Anubhab. ERC hoodie by Nupur. 2 standees for Chemistry club by Joshita. Work-report compilation by everyone.



Inter IIT Tech Meet 11.0 DevRev High Prep ITC Digital Council

Expert Answers in a Flash: Improving Domain-Specific QA

"Focusing on issues? Chat with us." We have seen this almost on all support platforms. This is followed by an automated bot that checks if the issue is a duplicate, which further checks if this should be routed to a human support agent. Checking "If this should be a human support agent?" and providing useful suggestions to the user is an interesting and a tough challenge. To solve this, we think lots of details are done right.

Recruitment Open\* Deadline 15 Dec 11:59 PM \* form link in description Devansh 70161 04906 Poyal 72809 11163

Inter IIT Tech Meet 11.0 DRONA AVIATION ITC Digital Council

PLUTO DRONE SWARM CHALLENGE

Drone one for objects to look at, but understanding what goes behind flying one, might be quite the opposite. No worries - we'll send you a guide to help you. You will have some time (and Python!) to figure out how to make it serve the way you want. Make it go rectangles, and play seek with them, when the fun starts on...

Recruitment Open\* Deadline 20 Dec 11:59 PM \* form link in description Devank 83848 53791 Pyush 83578 74344



# MID-TERM REPORT

## Creatives & Media Team

**Manager**  
Aditya Malhotra

**Conveners**  
Hitesh and Akshat

2022

## **Weekly reels**

A new initiative by ITC to promote events on social media regularly and increase our reach. Its primary aim is to show people how tech culture evolves in Institute and promote people to participate in different activities conducted by ITC.

<https://www.instagram.com/p/CelWsgFjWna/>

<https://www.instagram.com/p/CjHfyp9Dvao/>

<https://www.instagram.com/p/CdA-62jjnLB/>

## **Summer Project video**

This video is a combination of ITSP, SOS, and SOC.

### **ITSP**

Institute Technical Summer Projects aka ITSP is an annual program organized by ITC for freshmen. The aim is to provide first-hand technical exposure over the period of summer vacations. It also serves as a platform where one explores a field not aligned with their own major. Students are encouraged to also target some real-life problems that can be solved using technology. Selected projects are provided with mentorship by senior undergraduates who have worked on similar projects.

Final presentation announcement :

<https://www.instagram.com/p/CgbQviejabR/>

### **SOS**

Summer of Science is an initiative by the Math and Physics Club, to encourage, and help discover, the joy of learning.

### **SOC**

Summer of Code is an initiative of the Web and coding club, it gives an amazing opportunity to learn and dive into coding under the mentorship of the best in our institute.

Video :

[After Movie | Summer Projects | 2022 #techiitb](#)

## **Sophie immersion**

It is the event conducted for sophies who just come after the Covid19 pandemic to showcase to them what kind of activities are conducted by ITC like our flagship events XLR8, RC Plane, and many more. Its primary aim is to show people how tech culture evolves in Institute and promote people to participate in different activities conducted by ITC.

Video :

[https://drive.google.com/file/d/1yk6ta-zHpeEElvde9VX33dScVs6SX9Bn/view?usp=share\\_link](https://drive.google.com/file/d/1yk6ta-zHpeEElvde9VX33dScVs6SX9Bn/view?usp=share_link)

## Tech RnD Expo

The flagship event of this year is Tech and RnD Expo 2022, Conducted on 15 and 16 October.

Covering highly advanced workshops, lecture talks, tech displays and so much more.

The most prestigious institute displays all the tech projects and tech teamwork in the biggest event of the year. To exhibit how beautifully technology combines and adds value to uncountable domains, ITC brings "Tech & RnD Expo" - a 2-day event full of interesting technical projects, industry talks, workshops, and amazing hackathons.

Teaser :

<https://www.youtube.com/watch?v=TYzlu5mteGk>

Trailer :

<https://www.youtube.com/watch?v=Rq4jQNGCBNY>

After Movie announcement :

[https://www.youtube.com/watch?v=YATkb95\\_Vls](https://www.youtube.com/watch?v=YATkb95_Vls)

After Movie :

<https://www.youtube.com/watch?v=ihkGzRbz-vg>

## Team Sunya Orientation

This video showcase how global warming is affecting the Nature surrounding us, How we can bring changes by changing the way we live. It basically promotes sustainability by making houses sustainable.

Video:-

<https://drive.google.com/file/d/1dHnZo2v7ysQ4zhkWkOpJPJJnjwdbS4c-/view>

## XLR8

XLR8 is the first Technical Competition of the Academic year held by the Robotics Club in IIT Bombay. The primary task is to build a manually controlled bot capable of negotiating different kinds of obstacles in its path in stipulated amount of time. The team which completes the task in minimum amount of time wins. There are also prizes for other aspects of the competition which are be declared during the XLR8 orientation.

After Movie :

[https://drive.google.com/file/d/1T1hygBZ-9ICBB2ue2K0sj\\_i8hipg2P\\_Z/view](https://drive.google.com/file/d/1T1hygBZ-9ICBB2ue2K0sj_i8hipg2P_Z/view)

## UG & PG Orientation

In PG and UG Tech Orientation all the clubs and tech teams introduce themselves. They take dive into the plethora of tech, where you can meet people who share the same interests, or would like to work on things of your interest, or just explore different domains.

PG orientation held on:- 29th and 30th July 2022

UG orientation held on:- 3rd Nov 2022

Trailers

PG- <https://www.instagram.com/p/CghH2D-jUyq/>

UG-<https://drive.google.com/drive/folders/13-Z9KAwiVzQULNK6rrSZ6rpGey95oIEU>

Above is UG Freshers Intro Video Collection.

## Work division

All the work has been divided equally among all the conveners, I(Aditya) combine all the videos given by conveners and give a final touch on that.

# MID-TERM REPORT

## Web Team

**Managers**

Eshu Koli and  
Mohit Sharma

**Conveners**

Areeb, Prakhar, Anshika  
and Subham

2022

## TechPoints Portal:

This Portal is the start of a revolution in the institute. We made a digitized reward-giving system in this portal. This gives clubs space to list all the prizes they have to offer in the events/competitions/works hops etc., beforehand so that students can redeem their tech points in exchange for a prize via this portal.

So now every club distributes tech points as a prized currency to the winner so they can redeem it for any prize of their choice.

The screenshot shows a web browser window for the Tech Points Portal. At the top, there is a dark-themed login box with the 'itc' logo and a 'Login with SSO' button. Below the login box, the main dashboard is visible, featuring three large orange and red cards with the following data:

Current Points	Total Earned	Total Redeemed
0	0	0

Below the cards, there is a brief description of the portal's purpose and a 'Keep Linking!' button. At the bottom of the dashboard, it says 'Developed by Web Team with ❤️ | Institute Technical Council 2022'.

Link- <https://itc.gymkhana.iitb.ac.in/techpoints/>

## Student Wellness Center:

We created an EMR website for the Student Wellness Center. It contains a Student and counselor interface, and students and counselors can log in using LDAP and Google authentication respectively. It schedules appointments in the Google calendar and sends an automated mail of the appointment and also takes a record of all previous appointments and prescriptions. It allows counselors to take notes, write descriptions and upload psychometric assessments.

The screenshot shows the homepage of the Student Wellness Center. It features a large image of the Indian Institute of Technology Bombay building, the center's logo, and the text 'Student Wellness Center Indian Institute of Technology Bombay'. There are two purple buttons labeled 'Student' and 'Counselor'.

The screenshot shows the student dashboard of the Student Wellness Center. It has two main sections: 'NEW APPOINTMENT' and 'CONTACT US'. The 'NEW APPOINTMENT' section includes a plus sign icon and a note about catering to psychological needs of IIT-B students. The 'CONTACT US' section includes an icon, the center's address, operating days, timings, contact number, and email id.

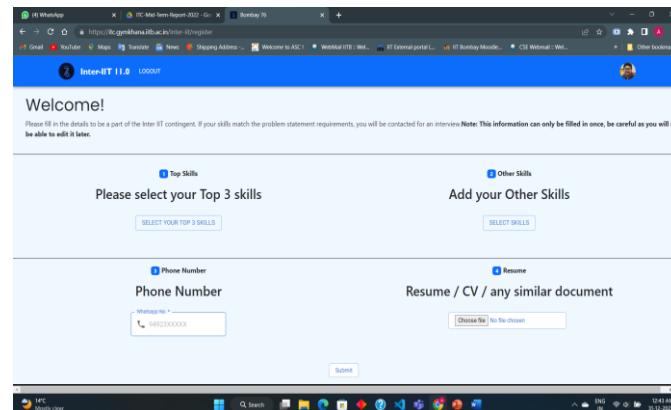
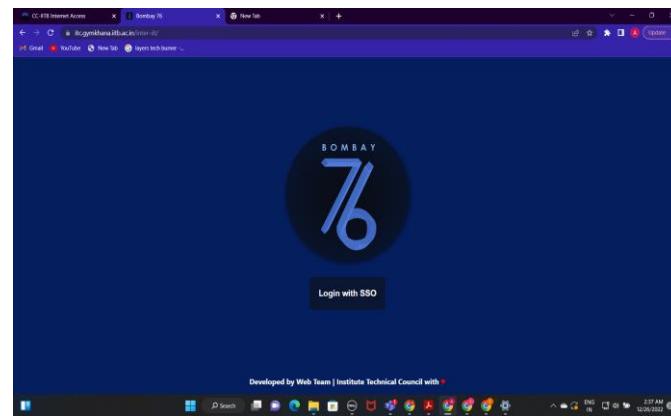
## Inter IIT Portal:

For Inter IIT Tech meet, This portal caters to students from the institute who can log in using their LDAP and update their skills accordingly. Their batch and branch will be fetched automatically, and they can rate their skills according to their level of familiarity.

Students can also participate in problem statements they like, This portal consists of an admin page through which admins can communicate and add comments to work

They can also upload your resume to it.

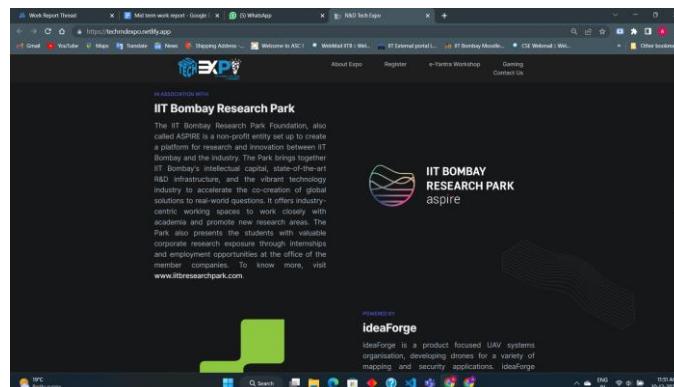
Additionally, they can also refer their friends during the selection procedure.



Link:- <https://itc.gymkhana.iitb.ac.in/inter-iit/>

## Tech & RnD Expo:

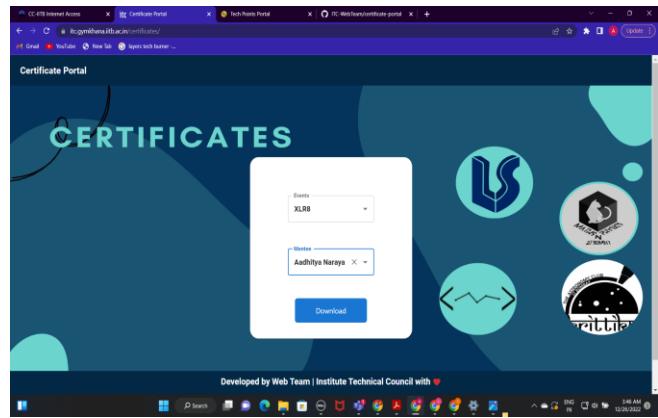
Tech & RnD expo was organized by ITC, this event includes lectures and an exhibition of Tech teams' Work and various ITSP projects, ITC also invited corporates to the exhibition to increase their interest in giving sponsorship and internship opportunities to IIT Bombay. We made a website which gives information about Lectures, the Exhibition and fun zone at the expo



Link : <https://techrndexpo.netlify.app/>

## Certificate Portal:

This portal allows students who participated in events like ITSP, SoC, SoS, Learners Space, and XLR8 to download their certificates with just a single click. The website lists the event and names of the mentees along with their mentors and provides them with the certificates of the events they took part in. It eases council work and helps in resume verification of both mentors and mentees.

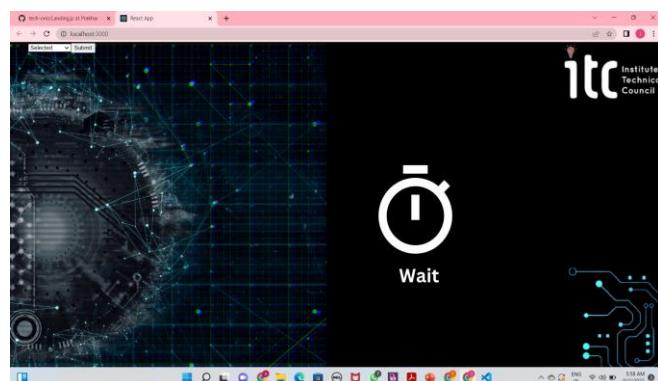
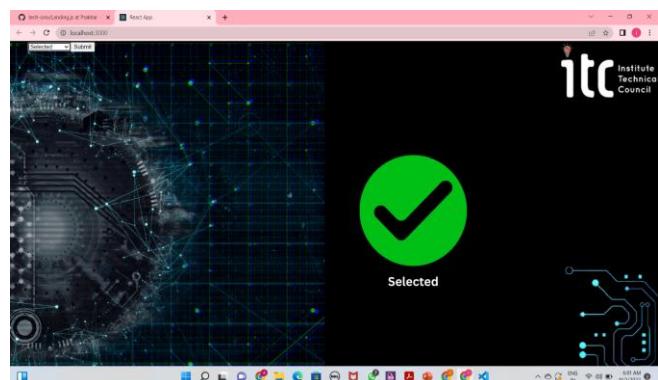


Link:-

<https://itc.gymkhana.iitb.ac.in/certificates/>

## Technical Council Orientation website:

Made a website for freshers' technical orientation, it randomly selects a random no. of people who log in, and we invite them on stage to perform specific tasks pre-decided by the council.



## Bill Reimbursement Portal {Ongoing}

Developed a bill reimbursement system for the Technical council to reimburse all the bills from clubs and other activities/camps/workshops.

# MID-TERM REPORT

## Cyber Security Club

**Manager**  
Prashul Vaishnav

**Conveners**  
Maithri, Nilabha,  
Khushang, Bhavana &  
Harshal

2022

## Introduction

We actively encourage cyber security knowledge among the students as the Cyber Security Community (CSeC). We engage in different cyber security competitions and events and support passionate students on their path to learning cyber security. To spread information on hacking and cybersecurity and encourage students to delve deeper into the area, we also host a variety of events and seminars. Additionally, we act as a link between the student body and the various organizations at IIT Bombay engaged in cyber security research and development, relaying information between them and the student body.

To expand our reach and become more approachable to students, we have also made the move to being a formal member of the Institute Technical Council in this tenure.

We represent IIT Bombay on any matter relating to digital privacy and security, whether in a technical setting or in a context involving general public awareness.

## Events and Talks

### Hacking via CTFs (Hands-On Session)

On November 30, 2022, we held a hands-on workshop titled "Hacking via CTFs" to show students how they might get started in the hacking world by participating in Capture The Flag (CTF) contests. CTFs are hacking competitions where competitors must exploit a system and submit a flag as evidence of their "penetration."

The attendees were given an introduction to the world of CTFs and the different CTFs that are held all around the world. We taught them how to think like hackers while showcasing a few CTF tasks. During the process, we discussed the many CTF types, categories, and what each of those categories entailed.

The attendees were first demonstrated how to solve CTF challenges, following which they were given a challenge to solve on their own demonstrating the Insecure Direct Object Reference (IDOR) vulnerability. The audience used their newly acquired hacking abilities to complete the challenge by acquiring the flag.

At the conclusion of the session, there was an optional segment in which we discussed how cryptography may be used to address a challenge in social dating.

We also curated a set of four takeaway challenges which were given to the attendees to solve. We received answers from multiple participants who were overjoyed at their skill improvement in the field.

This event saw the participation of 180+ students, exceeding our expectations with a full house in the LC.



## SEC Talks

We organized two security talks hosted by distinguished professionals in the field. These talks were titled 'SEC Talks'.

### SEC Talks I - Cyber Security: The Present & The Future

We conducted our very first SEC Talk on 17th June, 2022. Aman Aryan, Security Researcher at Payatu, and Kumar Ashwin, Security Consultant at Payatu, jointly presented a talk on the current threat landscape and future professional opportunities in this burgeoning field. The speakers walked an audience of 50+ students through a broad overview of the cyber security industry, possible learning paths to break into the field, and various career options with an emphasis on the interdisciplinary nature of the field.

The attendees enjoyed a highly interactive and enjoyable session, in addition to personal advice from the speakers. This was the first event of our tenure and was exceedingly well received by the audience, laying the foundation for future events of our community in which attendance increased exponentially.



### SEC Talks II - The 5 C's and 3 M's of Cyber Security

On July 29, 2022, Mr. Sanjav Vaid, the current director of the reputable company Deloitte, hosted an SEC talk that offered important insights into how cyber security is managed at an industrial level. The speaker provided a truly insightful talk about how cyber security plays a significant role in industries and businesses and what best practices are needed to be followed to ensure that an organisation is protected against cyberattacks and cyber espionage based on his years of experience and expertise in the field. As he led the audience of more than 85 students on an enthralling journey about how organisations safeguard their digital assets and the various types of attack vectors that adversaries try to utilise, he captured the attention of the audience, who were all on the edge of their seats. We gave him a memento as a token of our appreciation for having him visit our institute.



## Turing Prize (now AI Alignment Awards)

We assisted the Turing Prize researchers in facilitating their sessions. They were a multinational team of academicians who were looking for and rewarding young minds interested in conducting ground-breaking research in the area of artificial intelligence. They gave a number of engaging presentations on their research projects, generously distributed books for the attendees to peruse and contemplate over, and gave out prizes to those who had the best solutions to the challenges they posed.

With an attendance of 45+ enthusiastic students, the speakers ensured that the attendees were riveted throughout the session and that they could truly appreciate the difficulties and consequences of the research work in the field. When they left, they opened the doors to a research opportunity in advancing and understanding the limitations of AI which several of the students proceeded to pursue.

## Tech & RnD Expo

On October 16th, 2022, we helped conduct a talk on Advanced Cryptography for Emerging Applications. The speaker was Prof. Manoj Prabhakaran on behalf of IITB TRUST Lab. The hour-long interactive session took place in the Main Auditorium of the Shailesh J. Mehta School of Management and saw an audience of 50+ enthusiasts including students and professionals.



The speaker covered topics including fully homomorphic encryption, secure multi-party computation, digital cash, electronic voting, blockchain technology, private information retrieval, zero-knowledge proofs, identity-based encryption, secret sharing schemes, and attribute-based encryption to showcase the ubiquitous usage of advanced cryptography in emerging technologies.

## PG Orientation

At the PG Orientation on July 30, 2022, the incoming class of post-graduate students was introduced to our community. We described who we are, what we do, the activities of our community, and how they may get engaged with our community to a group of more than 40+ PG freshmen. Following the orientation, a number of PG students expressed interest in being a part of our community and actively wanted to explore cyber security with us.



## Reading Groups

We held a few reading group meetings where a research article was chosen and thoroughly discussed by the conveners and a group of eager students in order to gain a deeper understanding of it and advance our knowledge.



### Reading Group I - New Directions in Cryptography

We read the ground-breaking article *New Directions in Cryptography* by Whitfield Diffie and Martin E. Hellman, which was published in *IEEE Transactions on Information Theory, Volume IT-22, No. 6*. In addition to introducing public key cryptography and describing how it might be used for encryption and authentication, this study also explored its complexity. By addressing a number of issues in the field of cryptography that were at the time considered to be challenging, if not impossible to overcome, this study significantly revolutionized the discipline.

We had a very insightful discussion based on this paper with both offline and online participants, and everyone contributed their own unique thoughts and opinions regarding the same.

### Reading Group II - Smashing The Stack for Fun and Profit

We selected the article *Smashing The Stack for Fun and Profit*, published by an individual under the hacker alias Aleph One in the *Phrack Magazine, Volume Seven, Issue 49*. This study exposed the potentially harmful effects of stack buffer overflow and illustrated how numerous systems could be seriously compromised by this vulnerability. The author also discussed how the systems might still be exploited even with various mitigations in place. The audience praised the author's inventiveness, and we spoke about numerous possibilities to apply the idea to more contemporary systems. The dangers of overflow attacks beyond stack buffer overflows, including a thorough explanation of heap overflows, were also the subject of a fascinating discussion.

## Year of Security 2022

In order to expose newcomers to the topic of security and assist them in delving into its genuine technical aspects, we have created a year-long course called Year of Security. It includes coverage of all the major fields in cybersecurity, resources for them to explore further, solved CTF challenges for them to see their newfound knowledge in action, and challenges created by us for them to get their hands dirty and put their knowledge to the test. This course was created to introduce participants to the field of cyber security and prepare them for participating in CTFs, specialising in a particular category, or delving into more advanced research.

This course saw the participation of 500+ mentees along with 75+ mentors guiding them through their arduous journey. We conducted office hours to address common doubts and expand on what was covered in the modules provided.

The course was divided into many modules, and in order to receive the certificate, the mentees had to complete at least two tasks in each module. The mentees' work was evaluated, and those who finished the program successfully received certificates. A certificate for their mentorship was also given to the mentors.

## Basics of Hacking Module

- We crafted a module covering the basics of hacking in three parts:
  - Linux
  - Python
  - C and ASM
- We created 11 challenges on the above topics, ensuring that the mentees flex their hacking muscles.

## Cryptography Module

- We crafted a module on Cryptography in three parts:
  - Classical Cryptography
  - Introduction to Modern Cryptography
  - More on Modern Cryptography
- We created 9 challenges on the above topics, testing the skills of the mentees on their newfound knowledge.

## Digital Forensics Module

- We curated a module on Digital Forensics in three parts:
  - Steganography
  - Image Forensics
  - Network Forensics
- We created 7 challenges on the above topics for the mentees to hack through.

## Club Activities

### Convener Training

- To make sure the conveners were proficient in the field of cyber security, a series of intense convener training workshops were held at the start of the tenure.
- These sessions were conducted by prominent members of the community - hackers who go by the pseudonyms *Owl.A*, *deuterium*, *whoami*, *feynboy*, and *eragon*.
- This set of training sessions was conducted over several days where the conveners were provided with and expected to solve several challenges, including some actual CTF challenges, to solidify their understanding of the topics.

### Competitions

- The members of the community participated in several cyber security competitions.
- Our CTF team participated in various CTFs, including ShellCTF, GoogleCTF and ReplyCTF.
- Some members of the community participated in The Ninth International Olympiad in Cryptography organised by NSUCRYPTO.
- Several of our members solved challenges in Advent of Cyber 2022, pwn.college, picoGym, Cryptopals, CryptoHack and OverTheWire.

## T-Shirt & Hoodie Design

We created a design for T-shirts we'd want to have for our community. After creating the aforementioned design, we printed the T-shirts in various sizes and distributed them to the core team, the active members, and the alumni who were involved in building the community.

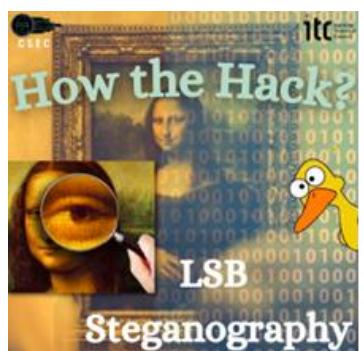
During the winter, we also crafted a design for the hoodies we'd want to give our core team members. We printed the hoodies in various sizes and distributed them to the respective members.



## Social Media

### How The Hack?

- We developed the Instagram series *How The Hack?* in which our beloved mascot, Quack The Duck, walks readers through often-asked, pressing cyber security questions. Every article in the series examines a different aspect of cyber security, questions around it, and how it affects our daily lives. Every Thursday, a fresh post is published.
- We have made posts covering:
- An introduction to the series where we have detailed what the viewers can expect from this series.
- The Sherlock tool for performing basic OSINT research.
- How encryption in UPI works, its past vulnerability, and how it was patched.
- The Diffie-Hellman Key Exchange and how two parties can converge to a shared secret even in the presence of a completely untrusted communication channel.
- A recent social engineering attack that led to the accounts of several Instagram users being compromised.
- Onion routing and how browsers like Tor maintain anonymity while browsing the dark web.
- What CVEs are and examples of a recent CVE in WhatsApp.
- What Fully Homomorphic Encryption is and how it can be applied in future industries.



## Social Media Links

LinkTree -

<https://linktr.ee/csec.iitb>

Google Calendar -

<https://calendar.google.com/calendar/u/3/r?cid=Y3NIYy5paXRiQGdtYWlsLmNvbQ>

<https://csea-iitb.github.io/IITBreachers-wiki/>

Discord - <https://discord.gg/hYthhnGVdN>

WhatsApp - <https://chat.whatsapp.com/GHQsnwNmFiC8ftAcV06iOk>

InstiApp - <https://www.insti.app/org/csec>

MS Teams -

<https://teams.microsoft.com/l/team/19%3a0d6a19a1f5f5412bbf7501f0671cb518%40thread.tacv2/conversations?groupId=ba80b01a-5b17-43ca-bf6c-7513ada73a2d&tenantId=403ee5f4-55b3-45cd-8ae2-824be887a075>

Instagram - <https://instagram.com/csec.iitb>

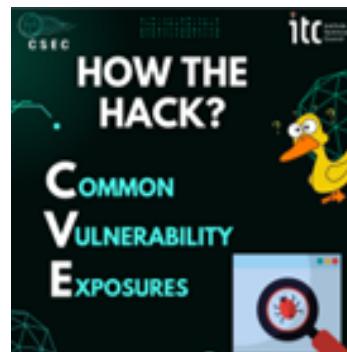
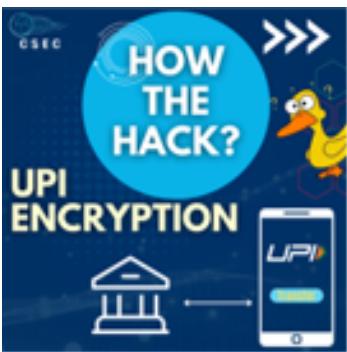
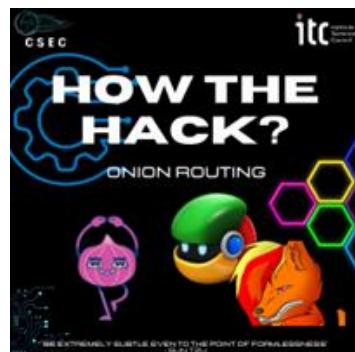
LinkedIn - <https://www.linkedin.com/company/68675965/>

Email - [csec.iitb@gmail.com](mailto:csec.iitb@gmail.com)

Facebook - <https://www.facebook.com/groups/csec.iitb>

## Publicity and Outreach

We collaborate closely with the TRUST Lab and the Information Security Research & Development Center (ISRDC) Lab to promote their activities and opportunities to the IITB student body. We serve as a bridge to transfer information smoothly between them.



# MID-TERM REPORT

## DevCom

OC

Dev Moxaj Desai &  
Shruti Singh

**Project Lead**

Adithya, Ashwin, Ayush,  
Harsh & Palash

**Design Lead**

Abhishek & Ananya

**Team of 21 Developers**

# 2022

```

from IITB import Developers as DevCom
class Developers(DevCom):
    def __init__(self, teamMembers, web, app, fun):
        self.teamMembers = teamMembers
        self.web = web
        self.app = app
        self.fun = fun
    def Website(self):
        webDev = filter(lambda member: member.web == True, self.teamMembers)
        return webDev
    def App(self):
        appDev = filter(lambda member: member.app == True, self.teamMembers)
        return appDev
    def Fun(self):

```

## ABOUT US

This is the official page for the Developers' Community of IIT Bombay. Envisioned as a group of the best developers in the Institute, the team is responsible for developing and maintaining InstiApp, Resobin, and other dev/tech related projects in the Institute.

*Envisioned as a group of the best developers in the Institute, the team is responsible for developing and maintaining InstiApp, Resobin, and other dev/tech related projects in the Institute.*



# DevCom Projects

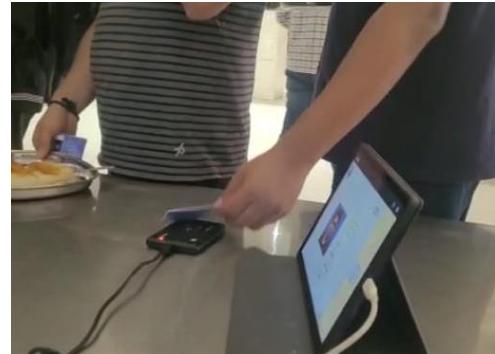
## 1. Mess-i in hostels

- Implemented in 9 hostels (H2, H3, H11, H12, H13, H14, H15, H17, H18)
- Integrated rebate into the system, students can now apply for the rebate, and it will be approved by hall managers
- It will be implemented in the freshers' hostels i.e., H1 and H16, once the students get their ID Cards

## 2. MRSP

- The Married Research Scholar Portal's development has been completed
- A demo of the portal was given to HCU
- Only implementation after Academic Office's approval is left

## 3. SAC Room Booking portal relaunched



## 4. DC Print

- The LDAP-based printer was developed and is now fully functional in Hostel 10 after a long testing period
- It will be implemented in other hostels too



## 5. Resobin

- Established it as the central resource repository with UGAC
- Revamped the resources
- Updated the timetable feature

The screenshot shows the Resobin platform interface. On the left, there's a sidebar with links like Home, Timetable, Courses, Minors, Honors, Anubhab, Contribute, Favourites, and Contact. The main area displays search results for 'Courses' with 3808 results. It lists three courses under Aerospace Engineering: AE102 Data Analysis and Interpretation, AE152 Introduction to Aerospace Engg., and AE153 Introduction to Aerospace. Each course has a brief description and a link to 'Timetable'. To the right, there's a filter sidebar for 'SPRING SEM AT 2022/23' and a map of the IIT Bombay campus. A sidebar on the left labeled 'INSTI APP' contains links for Feed, News, Explore, Mess Menu, Placement Blog, Internship Blog, External Blog, Insight Discussion Forum, Find Answers, Calendar, Map, Achievements, Quick Links, and Settings.

## 6. Insight Discussion Forum - IDF

- Ideated with Insight, the Insight Discussion Forum: a single platform for discussing issues relevant to the student community of IIT B.
- It is moderated by the Insight team to maintain decorum and healthy discussion.

## 7. InSeek –

query answering bot, integrated in InstiApp

## DevCom Sessions

### 1. DevCom's Orientation

We held DevCom Orientation on 16th January to introduce our projects and announce our recruitment for freshers.



### 2. Web Development Workshop

- In collaboration with WnCC, we conducted a hands-on session on the fundamentals of frontend web development- HTML and CSS
- A beginner friendly session open to students of all years



# MID-TERM REPORT

InstiX

OC

Payal Choudhary

Software Lead

Abhishek Pai Angle

Hardware Lead

Vedant Chandak

Core Team Members

Himanshu, Pulkit,  
Dheeraj & Saket

2022

# InstiX

## 1. Entry-Exit System

Developed an RFID-based card tap Entry-Exit system furnished with an online management portal for hassle-free movement of students and staff of the institute at gymkhana facilities.



## 2. Water Monitoring System

It has developed a monitoring system that checks the hardness of the water in all the drinking water facilities in hostels and notifies the authorities when the facility is unfit for use.



## 3. Food Wastage Monitoring System

In collaboration with H5 Council + H5 Techroom, a food wastage monitoring system is under development that tracks the monthly record of students and offers .

## 4. Inter-Hostel Registers

To digitize the insti and remove the bulky-fat registers, we are launching the inter-hostel entry-exit system. Students of other hostels now just need to tap their I-Card while entering and exiting. This will improve security and will be hassle-free for security.



# MID-TERM REPORT

## Ham Radio Club & Ground Station Segment

**Manager**  
Neeraj Prabhu

**Conveners**  
Alisha, Subham, Manas,  
Mehul & Anupsa

2022

## INTRO

Ham Radio Club has the vision to foster and grow the amateur radio community at IIT Bombay and beyond. Ham radio is a hobby and technology that allows us to interact with people across the globe and perform various exciting activities using wireless communication.

As a subsidiary of the IIT Bombay Student Satellite Program, we aim to set up a full-fledged autonomous ground station with advanced and updated technology while attaining numerous ham radio licenses.

## Publicity:

Our Facebook page now has 1,700+ followers. Exclusive content is posted on each social media platform regularly. Our Instagram account has 930 followers and 175+ posts as of now. Our WordPress blog has around 6,500+ views, 20+ follows, and 35+ blog posts. Our YouTube channel has 265+ subscribers and is rising.

## What we do:

HRC & GSS is responsible for maintaining the ground station and conducting several events for students and enthusiasts. We are at the testing stage of making an SSTV module, a transmitter for broadcasting images using the SSTV communication protocol.

Our annual flagship event, the Ground Station Workshop will be held on 4th February 2023 in the offline mode inside the institute. Insightful talks/lectures on various aspects of wireless communication are also organized. People from outside the institute will also be present for the event and we will have Mr. Yogeshwaran Jayaraman, Systems Lead, Astrogate Labs as the Keynote Speaker for the event.

The team has designed multiple antennas for tracking amateur satellites like the ISS, NOAA, FOX, and METEOR. We have received several images from the satellites such as weather images from the NOAA satellites (tracked using a QFH antenna) and SSTV images from the ISS (tracked using a Yagi Antenna and Robot36 application for decoding). We have also built an egg beater antenna and a rigid pole yagi antenna, which are currently being tested and changes are being made for better signal transmission and reception.

## Events: Track With Us

Date: 16th June 2022

Conducted by: Muskan Bhutra,  
Aarya Chaudhari, Neeraj Prabhu

Engagement: 50+ participants

The event was conducted on the Gymkhana Grounds at night, where the members of the club demonstrated the process of satellite tracking to the students. The NOAA satellite was successfully tracked using the QFH antenna, RTL-SDR and the SDR# software on the laptop. The process of satellite tracking was explained in detail to all the attendees and the reception was demonstrated, while receiving a weather image.



## Ground Station Workshop 2022

Date: 6th February 2022

Conducted by: 10+ SSP team members  
(including all HRC members)

Engagement: 130+ concurrent viewers

GSW is the annual flagship event of HRC and invites students from every corner of the country to attend this 1-day long workshop.

It was conducted completely in the online mode owing to the pandemic. Attendees were taught some of the basic parameters and equipment required to build a basic ground station. They were also informed of some non-technical aspects such as the intricacies of building and maintaining a team, cost analysis.

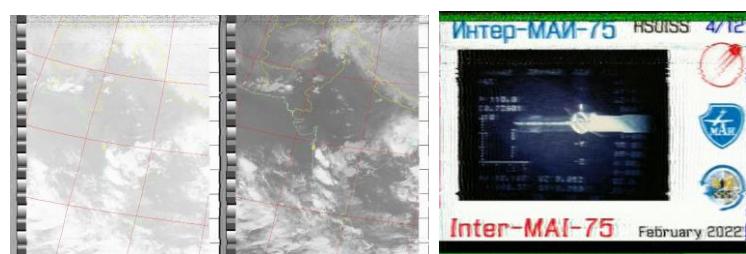
The Keynote Speaker, Mr. Ashhar Farhan (VU2ESE), Founder and CTO, Satellize, shared the journey of the growth of ham radio and wireless communication over the years. He also gave insights into the operation of a ground station and what upcoming ham clubs and enthusiasts can explore.



## Tracking Sessions:

Multiple training sessions for the members of Student Satellite Program for tracking satellites in the offline and online mode.

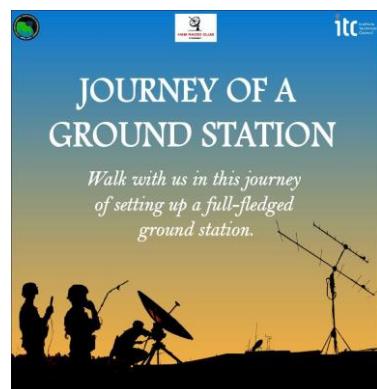
Students successfully tracked NOAA and ISS satellites, both using WebSDR (online) and using antennas and RTL-SDR.



## Blog Series:

### Journey of a Ground Station

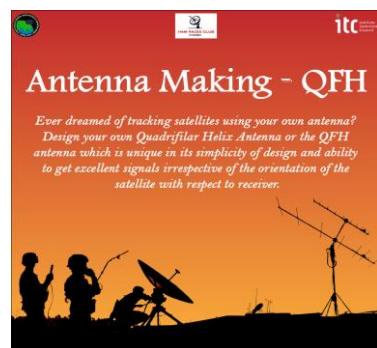
This blog series is meant to be for people who are aiming to build their own ground station. The blog will be updated with new articles as we develop our ground station here at IIT Bombay with detailed steps on how to make antennas and work with different equipment.



## Instagram Activities:

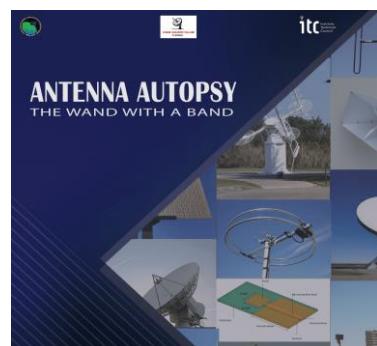
### Antenna Autopsy

A series depicting different types of antennas, their uses and their working. Some quizzes were also held on the Instagram story related to these antennas to increase participation and enthusiasm.



### Fiddle with Riddles

An interactive riddle series about different kinds of essential equipment used in a ground station. It is supposed to be a precursor to the ground station workshop in order to increase the curiosity regarding the devices.



# MID-TERM REPORT



Controls & Dynamical  
Systems  
Student Reading  
Group

**Managers**  
Chinmay Pimpalkhare  
& Hemant Hajare

2022

## OVERVIEW

The Controls and Dynamical Systems Student Reading Group or **CDS-SRG** creates a platform for students to discuss, collaborate and exchange views on topics like Control Theory, Automation, Robotics.

Over the years, we have witnessed an increase in the number of projects related to being pursued under various initiatives by ITC. These projects have been instrumental in sparking enthusiasm towards robotics in a lot of students. These projects are, however, in most cases, pursued without sufficient depth in theoretical and practical knowledge in areas like analysis of dynamical systems, the design of control and filtering algorithms to name a few, which eventually leads to the original objectives remaining unfulfilled. Through this reading group, we envision to bridge this gap, promote discussion on topics in controls, facilitate exposure to the associated mathematics and delve into implementation details involved in real-life applications. We also want this exposure to encourage more students to pursue research theoretical or implementation-based, in these areas.

## Publicity

The following is the website for getting to know all the recent developments of CDS-SRG.

<https://sites.google.com/iitb.ac.in/cds-srg-iitb/home>



Several other initiatives are in the pipeline, like CDS-SRG's new youtube channel, website, research talks by professors and many more to come.

# THANK YOU

2022

Stay Connected  
with ITC

