About Myself

I am Innoguide. My name is derived from the word “Innovative Guide Robot”. I am an autonomous robot that can navigate within CFI and I can take delegates visiting CFI on a tour explaining the projects they want to know about and even CFI in general. I am integrated with a large language model within me. So, I can understand any question you ask in English and reply to your question based on the data I got trained on. I am built as a project under the iBot club of CFI; started in the year 2023-24. The people associated in building me are

Krishna - Mechanical Engineering 2025 batch - Project Head
Sooraj Skanda - Electrical Engineering 2025 batch - Project Strategist
Satya Sai - Engineering Design 2026 batch - Navigation Module Head
Shreyas - Engineering Design MS Scholar - Navigation Module Mentor
Rahul - Aerospace Engineering PhD Scholar - Interface Module Mentor
Nitin - Project Associate under Prof.Ganapathy Krishnamurthy - Interface Module Mentor
Gautam - Electrical Engineering 2026 batch - Project member in interface module
Ishita - Mechanical Engineering 2026 batch - Project member in interface module
Jyotsna - Engineering Design 2026 batch - Project member in interface module
Shanmukesh - Civill Engineering 2025 batch - Project member in interface module
Pradeep - Electrical Engineering 2026 batch - Project member in navigation module
Maheshwar - Electrical Engineering 2026 batch - Project member in navigation module
Ankush - Ocean Engineering MS Scholar - Project member in navigation module
Kannikeshwar - IDDD Robotics 2026 batch - Project member in navigation module
Chandrasekharan - BioScience Department 2026 batch - Project member in navigation module
Yogesh - Mechanical Engineering 2026 batch - Project member in hardware module
Mourya - Electrical Engineering 2026 batch - Project member in hardware module
Rishi - Mechanical Engineering 2026 batch - Project member in hardware module

CFI - Centre for Innovation

Tagline for CFI - “Walk in with an idea, walk out with a product”
The current year is 2023-24

The Centre for Innovation (CFI) was established on the premise that innovation emerges through community interaction and the freedom to learn and experiment. Constituted in 2008, with the help of funds raised by the class of 1981, this unique 24/7 student lab is located at the New Academic Complex in the heart of campus. After almost a decade of the team's zeal and passion, combined with a comprehensive inventory, ample workspace, guidance from faculty and students. These clubs' interests are spread over a wide spectrum primarily fostering innovation and invention in technology, with a focus on technologies aimed at contributing positively to the environment and to the society. Several CFI projects have been patented and have received national recognition. The team frequently represents IIT Madras in national and international competitions. It also constitutes an integral part of IIT Madras' entrepreneurial culture, with many CFI projects turning into startups.

Clubs at CFI are its functioning organs. Divided based on interest, each club represents a student group highly enthusiastic in that specific field. Knowledge transfer, resulting in reducing the learning period is the strength of clubs at CFI. CFI is now home to 13 clubs

CFI's Competition teams are groups of highly motivated individuals who work round the clock to meet challenging deadlines of various competitions. Over the years, our teams have bagged prizes both at the national and international level. CFI has 7 competition teams in the year 2023-2024.

Clubs at CFI are iBot club, AI club, Bio tech club, electronics club, aero club, 3D printing club, team Sahaay, team envisage, programming club, horizon club, Product Design club, maths club, webops and blockchain club

Competition teams at CFI are Raftar formula racing, Team Abhiyaan, Team Anveshak, Team Avishkar Hyperloop, Team Agnirath, Team Abhyday, iGem

The motive of a competition team is to participate in a competition in their respective specific competition they are aiming for. For this, the existing team members recruits students by sending out an application and an interview followed by. In the process of building, they learn a lot of technical stuff and build industrial connections, patents, publications, attend conferences etc. other than their competition.

Each club works in their specific domain. They conduct an event called Summer School in which coordinators of each club teaches the concepts in their respective domains to GSB (General Student Body).

Clubs:

iBot club -

Initiated in 2008, with a vision to raise the level of Robotics in the institute to an international standard, the iBot club is currently one of the most active clubs in CFI engaging over 600 students. The club aspires to enable students to explore their creativity and engineering skills through robotics by engaging them in exciting mentor based programmes, cultivating in them both technical skills as well as teamwork. It has succeeded in sending teams to competitions like URC, ROBOCON, DRDO, IARC, IAUVC and FIRA.

By offering indispensable guidance through workshops and tutorials along with equipment to all the interested students, iBot club helps students express their skills, knowledge and creativity through conceptualising and designing state of the art prototypes. iBot club is not leaving any stone unturned in the process of becoming a self-sustained student robotics hub.

The iBot Club is home to many of Insti's robotics enthusiasts who spend a great chunk of their time designing and prototyping robots which can perform any required task. It organises regular

workshops to inspire students across varied technical backgrounds to develop their ideas and expose them to the wonders of robotics
Some Achievements of iBot club -
Unsurprisingly, the club secured a Bronze (Overall 7th place) in the Inter IIT Techmeet 9.O - 2021 conducted by IIT Guwahati. The problem statement was AgroBot which would perform multiple agricultural tasks such as Weeding, Transplantation, Seed sowing and need to be economically favourable for marginal farmers. The club's proposition came in the form of development of a robot which could perform all the above tasks along with Ploughing, Fertilising in addition. In due course, it was transformed as a club project - Project MPAV - Multi purpose agricultural vehicle.
IIT Madras' iBot club secured a Silver(Overall 4th Place) in the Inter IIT Techmeet 8.O - 2020 conducted by IIT Roorkee. The problem statement was about a Robot which can perform terrace farming. The club's Prototype was SAMOSA - Semi Automatic Machine Oriented for Step Agriculture. It was subsequently continued by the club as one of the Projects for the year.
In the year 2018 iBot organised an event where a group of floor cleaning robots were made to clean the CFI floors. It cracked the Limca book of records for the first time ever to do that with 45 Robots. There were a total 400+ participants working towards constructing and coding those robots.
One of the club projects, Project Artemis, got patented in the year 2017. It is basically a Rail Road Crack detection Robot. It was recognised for the unique design which enables it to travel on the inside of the track with wheels perpendicular to the ground and the innovative use of sensor technology to detect the surface cracks on the tracks. Current head of the club are Satya Sai and Abishek Sebastian.

Projects of iBot in the year 2023-24
Innoguide(Myself) - The CFI Guide Robot that can map the entire CFI building, navigate through it, and provide guidance to visitors find and visit various projects. The robot will use a path planning algorithm to determine the optimal route to take visitors to different projects. It would be capable of stopping at various projects to provide detailed explanations. The robot will also be able to respond to visitors' questions and engage in natural language dialogue (built on a gpt model) to enhance the visitor experience. Some learning outcomes for the project members(my creators) are "- Scope to learn and implement Mapping and navigation on a small scale
- Get to implement Exciting stuff like GPTs
- Deep learning curve and a useful output product.
- There is a huge scope to write research papers and present them in conferences."

Minions - "The Minions' is a swarm robotics-based year-long project. Four small robots of this kind will take packages from the user and deliver them to the destination in a given order. The paths chosen by the robots will be completely random, and all obstacle avoidance, path planning, and geo-fencing will come into play while the robots are traversing. To enable swarm robots to work together in a coordinated and intelligent manner, specialized algorithms will be used to control their movements and actions. These algorithms are typically developed using machine learning and other artificial intelligence techniques. Swarm robots need to be able to communicate with each other to coordinate their movements and actions. We'll typically be

using wireless communication technologies, such as Wi-Fi or Bluetooth, or other communication protocols, to exchange information and commands. Depending on the size of the package, if the package is bigger than the individual robots, the swarm robots should come together, either two or three, or all four forming a pattern to carry that package in a coordinated manner to the destination."

Tennistron - "Why tennis bot?

While traditional tennis training methods have been effective to a certain extent, there are still several problems that players and coaches face. One of the primary challenges is the limited availability of high-quality training partners. This can make it difficult for players to practice specific shots and drills, leading to inconsistencies in their performance. Additionally, traditional methods often lack the ability to provide immediate feedback to players, which can hinder their progress and development. There is also a risk of injury during traditional training methods due to overexertion or improper technique. These issues can negatively impact a player's performance and result in frustration and burnout. As the game of tennis continues to evolve, there is a need for more advanced and efficient training methods to help players stay ahead of the competition.

What’s the proposal?

Introducing the iBot tennis training robot - an innovative project aimed at revolutionizing the world of tennis training. We aim to design and develop an advanced robot that simulates real-life tennis scenarios, providing players with a controlled environment to practice and improve their skills. It will be designed in such a way that it can withstand the rigorous demands of tennis training, while its intuitive user interface will make it easy for players of all skill levels to operate. The Tennis bot should offer numerous advantages, including precision and accuracy in practicing serves, forehands, backhands, and volleys. With this cutting-edge technology, players will be able to improve their game and take their tennis skills to the next level. Join us in bringing the iBot tennis training robot to life, and let's make tennis training more accessible and efficient for all."

Team Amogh - Team Amogh is focused in the construction of Autonomous Underwater Vehicles which is Capable of performing pre-defined underwater Missions and are commonly used for Oceanographic Exploration

Team Pravahan - Research on the use of alternative clean energy fuels in marine vessels.
Some learning outcomes for the project members are
Hydrodynamics

Computer Aided design
Structural analysis
Compultational fluid dynamics

Mechanical transmission design
Composite manufacturing processes and testing

Energy

Computer Aided Design
Fuel cell stack design and manufacturing
Battery integration
Motor design and controls
Energy management system design and controls

Communication and Automation

PCB design, manufacturing and debugging
Sensor fusion
Control theory
Localization methods
Object detection
Path planning and guidance

Spons and PR

Sponsor relations
Graphic Design
Media and out reach management
Video Editing
Case studies"

3D printing club -
3D Printing Club was started in the year 2015 with the vision of promoting a new form of manufacturing technology among the students and driving research and innovation in the field of 3D Printing. The 3D Printing Club currently houses multiple 3D printers. Few of them were built during the 3D Printing Summer School conducted over the years with the support of the open source 3D printing community. It can take projects in collaboration with the other clubs in CFI to produce tailor-made industrial grade parts. The 3D printer is located at the CFI facility and can be commissioned by the students of IIT Madras. Tvasta is a full-fledged startup from the club and is now based in Bangalore. Tvasta was also one of the eight startups selected from the entire country by the Ministry of Housing and Urban Affairs to display their technology to Honorable Prime Minister Mr. Narendra Modi at the Global Housing Technology Challenge. Tvasta has it’s roots from the 3D printing club. In the year 2022-23, one of the projects of the 3D printing club was to build a pellet printer from scratch. Current heads of the club are Manikandan Nishanth and Suparn Gupta.

Projects of 3D printing club in the year 2023-24

Filament extrusion system - 3D printing can be sometimes be notorious and defects might occur in your model. And if that model is useless, then you should find a way to reuse the plastic. For this reason we want a filament extrusion system to make use of scrap plastic materials. It can also be used to produce our own filaments of different diameters, colours and materials depending on the usage, thus increasing the availability of different filaments and reducing input cost. Some learning outcomes from the project can be "- This is a new technology to our club, so it is an opportunity to gain experience and knowledge.
- Gain knowledge of using CAD/CAM softwares
- Working with tools and assembling hardware
- Working with electronic components and integrating them with hardware"

Ultrasonic metal 3D printer - Metal 3D printing is recently the most exciting application of 3D printing as we can make complex structures better than conventional methods. But the existing processes require high temperatures. In this project, we are using ultrasound waves as our energy source and welding two wires together for 3D printing, which can operate at low temperatures. Possible learning outcomes can be "- This is a fresh new technology. So one can gain skill to research
- Approaching professors and experts for research purpose and guidance
- Get to write research papers on this
- Gain knowledge of modelling using CAD/CAM softwares
- Working with electronic components and programming microcontrollers
- Creating software for slicing model
- Assembling hardware and tool handling"

Multi-nozzle 3D printer - Generally, FDM (Fused deposition modelling) 3D printers use one nozzle to make 3D prints. We are trying to make a 3D printer which can operate multiple nozzles. This enables us to create models with various materials to get desired properties, thus reducing the post-processing cost and creating complex multi-material structures. Making multi-colour prints without wastage is also possible. "- Gain knowledge of using CAD/CAM softwares
- Working with electronic components and programming microcontrollers
- Customizing 3D model slicing softwares
- Assembling hardwares and tool handling"

Pellet 3D printer - "The most popular types of 3D printer used widely are FDM(Fused deposition modelling), which utilises plastic filament as the input material, heats it and then extrudes it along a path to create an object layer by layer. The pellet-based printer switches the input material with raw industry pellets to reduce the cost per print by 5 to 10 times. Directly utilising enables us to use various cloths and material compositions. We will also use large extrusion widths to create large, vital parts (chairs, shelves, fibreglass moulds, etc.). We will design and make a custom Pellet extruder and a large-scale FDM printer. It's one of the most significant projects CFI has ever made and has heavy industry demand. Some learning outcomes are "- Gain knowledge of using CAD/CAM softwares
- Working with electronic components and programming microcontrollers

- Assembling hardwares and tool handling"
This is a project that has been continued from the year 2022-23.

Drone-Swarm -
This is a collaborative project of 3D printing club and Aero club. A swarming system consists of a group of UAV's which communicate to execute various mission objectives with minimal human intervention. Developing drone swarm tech involves several challenges including - testing involves complexity of coordinating multiple drones together , developing swarm software and increasing the battery life and charging capabilities of drone . Our ultimate goal is to make drone swarm technology accessible to the industry for various use cases, including surveillance, entertainment, and defence. By achieving this, we aim to drive innovation and progress in this field and provide more affordable and efficient solutions for various industries. One USP about this project is that, they are building their own flight controller (FC). Some learning outcomes can be
Product Design
- 3d-modelling and manufacturing
- Simulating different frames for drones
- Testing out different materials for drones

Aero club-
Being one of the earliest clubs founded in CFI, we are a 30-member family of drone and airplane enthusiasts whom the club has envisioned the dream to fly. We formally welcome new members each year, and our senior members take pride in backing the club—the club witnesses active participation with members from diverse branches of engineering and of different age groups. Regular workshops and timely meetings have kept the club lively throughout. The club has witnessed glory in several national and international competitions like IARC (International Aerial Robotics Competition); NAL MICAV (Micro Air Vehicle Flying Competition). Building our own crafts and watching them take flight is a proud experience for each member and we hope to have young, inspired minds work onboard with us to share the joy of flying!!
Some achievements are that, their project GAIA in the year 2022-23 secured 4th place in the Unacademy NRC competition, Project GAIA participated and secured fourth place in Unacademy's National Robotics Competition 2022, competing against 200+ teams and over 800 participants from across India. Team Gaia presented an autonomous drone with an attached manipulator arm capable of scooping soil to plant seeds for conducting mass afforestation drives in areas inaccessible to humans. Currently, the idea and mechanism are in the patenting process. The club won gold medal at 2021 Inter-IIT 9.0 DRDO DGRE’S VISION-BASED OBSTACLE AVOIDANCE DRONE. Current head of the club are Sanjeet Iyer and Abhigyan Roy.

Projects of Aero club in the year 2023-24
WingFlap - Generating lift through flapping of wings mimicking the natural flight of birds and insects.Ornithopters are much quieter than drones and planes despite being more efficient. This

can have several applications in the field of defense and military. Some learning outcomes can be "- understanding biomimicry and replicating it in a model
- use of ardupilot and design softwares like Fusion360".

ICU - Usually, Fixed Wing UAVs are used for long-range surveillance of military areas. Collected data by these UAVs are sent to the ground station where it is analyzed by military professionals. This system is quite inefficient as it requires significant human involvement every time to confirm any kind of irregularity. With the help of AI, this problem can be solved and efficiency of surveillance can be increased. And to aid for the AI to have control over the movement of UAV, a hybrid UAV is preferred over fixed wing UAVs. Some learning outcomes can be -Understanding working and learning to design hybrid UAVs
-Aeromodelling and getting familiar with RC electronics
-Flight programming and Flight controller firmware design
-Mathematical modelling and Simulation of dynamic parts in the UAV
-Product design, 3D modelling and fabrication of a UAV
-Computer Vision and Machine Learning models for surveillance

PlasmaWings - Autonomously delivering essential medical supplies to remote regions using a fixed wing UAV.This year we would be improving our existing design and also developing an autonomous system to drop the supplies at a designated location through mission planning. This is a project that has been continuing from the year 2022-23. Some learning outcomes can be "- Fixed wing Aircraft Design and Flight
- Manufacturing and Material selection
- Basic RC Electronics
- Autonomous navigation and obstacle avoidance using ROS
- Computer vision for dropping of payload and TLS(Take-off Landing System)
- RC Flying Fixed Wings"

Drone Swarm - A swarming system consists of a group of UAV's which communicate to execute various mission objectives with minimal human intervention. Developing drone swarm tech involves several challenges including - testing involves complexity of coordinating multiple drones together , developing swarm software and increasing the battery life and charging capabilities of drone . Our ultimate goal is to make drone swarm technology accessible to the industry for various use cases, including surveillance, entertainment, and defence. By achieving this, we aim to drive innovation and progress in this field and provide more affordable and efficient solutions for various industries. This is a collaborative project of aero and 3D printing club. Some learning outcomes from this project along the lines of aero club can be "- Navigation and control, autonomous flight systems
- Product Design, 3d-modelling and manufacturing
- Working of a multirotor UAVs, basic RC electronics
- Programming Drones with Dronekits/DJI/Mavproxy, Robotics with ROS and gazebo simulations.
- Communication and transfer of signals, GPS fundamentals,
- Assembly of compact UAVs."

Electronics club-
The Electronics Club was initiated in the year 2013 by 3 enthusiasts with a vision of building a creative space to cater for projects and ideas in the field of Electronics. Presently, it is a community of over 50 students across all disciplines, led by 7 Core members and managed by

12 Coordinators. The club has evolved in multi-folds since its inception and now caters to a wide array of interests in Core Electronics and related fields (not limited to) such as Robotics, Digital Design, Machine Learning and Signal Processing with real-life applications. The club also conducts comprehensive Mega Sessions and Summer School exposing various domains of Electronics.
The club is a space for anyone who is curious to experience hands-on electronics, ideate and curate innovative solutions, explore their interests, discover new skills.
Some achievements of electronics club are ELEC CLUB - SQIL NGO SESSION TO SCHOOL STUDENTS IN KERALA Collaborated with SQIL NGO for a session on “Arduino and NodeMCU basics”. Around 40 students from Grade 9-12 actively participated in the session.
ELECTRONICS CLUB DEVELOPMENT BOARD. Designed an In-house development board around the ESP32 WROOM SoC and comes with WiFi and Bluetooth functionalities. It has an inbuilt IMU sensor used for orientation measurements. It is fairly compact and it has the CFI and Electronics Club logos, giving it a classy look. Current heads of the electronics club are Jayaram and Mayur Daga.
Projects of Electronics club in 2023-24
Self Assemmbling cubes - Making Cubes which can move , attach and detach from other cubes. Basically it should assemble itself and make structure according to our wishes. It is similar to the microbots in the movie Big Hero 6. Some learning outcomes can be in IoT, Modular robotics, Design
FPGAudio - The beamforming microphone array with FPGA will capture crystal-clear audio from any direction, so you can be sure that you'll always sound your best. Some learning outcomes can be FPGA(Field Programmable Gate Arrays) Programming using Verilog , indepth analysis of digital electronics.
Printer Pro - A problem that we frequently encounter is the need to find a printing shop that's open anytime we’re in need of it. We aspire to set a full stop to the issue, with a system that allows you to modernize printing, replacing the presence of a shopkeeper in a printing shop. The features of the system closely resemble the vending machine, where one pays for the print he/she intends to get. Hereby, we’re taking a step forward in digitizing the future of digi-printing. Some learning outcomes can be working with Displays , Arduino Programming ,Working with Raspberry Pi (A pocket computer) , making software interfaces for accepting money
Versa Grip - It aims to create a wearable tool that will greatly benefit people with paralyzed fingers who face numerous daily challenges, such as using utensils, scissors, and knives. By selecting different modes, the tool will provide the necessary functions, such as a spoon for eating or scissors for cutting. This tool will not only assist those with physical disabilities but also anyone who desires a convenient, all-in-one tool. For instance, electricians can use it for wire stripping, cutting, and testing. Our vision is to enhance the daily lives of individuals through this innovative wearable tool. Some learning outcomes can be - Work and learn in R2D2(Center for Rehabilitation Research and Device Development) - The project is under Prof. Manish Anand, So you will get mentorship from the prof, You will get to learn mechatronics, you will be able to make a environment impactful project.

HORIZON club-
Horizon, the Physics and Astronomy society of IIT Madras is a registered voluntary student organization, which promotes the learning of physics and astronomy on campus and in the community. The club organizes numerous talks conducted by professors and students alike along with observation sessions that are also conducted off-campus to provide a recluse from the threat of the air and light pollution in the metropolis that is Chennai. Apart from different

activities open to the entire student community, the club also undertakes student research projects based on physics and astronomy every year. Many members join the club with little to no prior experience, the only prerequisite being a thirst to learn more about the universe. The club provides them with an opportunity to enjoy the company of other equally enthusiastic students while learning more about the secrets of the cosmos, with one sole purpose in mind – To explore space: the final frontier; to boldly go where no man has gone before!
Achievements - SPACEPORT AMERICA CUP, A team that started out as a CFI club project got its way into competing in the Spaceport America Cup, 2022, the first ever IIT in the country to do so! The subsystems in the team are - engine, test stand, hardware and software, sponsorship, and PR. ASTROWEEK - This week happens at the beginning of the odd semester and sees participation from several freshmen. A series of lectures and observation sessions are conducted during this time. It's an excellent opportunity to be involved in club-activities and get to know more about the club. SWAN AND GURU DHWANI ANTENNA CHALLENGE; Horizon has formed a team to participate in the SWAN antenna design challenge conducted by IUCAA. The Indian Sky Watch Array Network (SWAN) Project was started by Raman Research Institute (RRI) to establish a Very Long Baseline Interferometry network by building antennae at educational institutes across the country. In September 2021, Horizon formed a team to participate in the Guru Dhwani Radio Antenna Design Challenge to observe radiation from the Jovian atmosphere. The team is currently working on optimizing the antenna design parameters. INTERIIT TECH MEET 2021; Horizon participated on behalf of IITM in the InterIIT Tech Meet 2021 for the ISRO Astrosat visualization tool designing challenge. We built the backend to take care of data manipulation, cleaning, and metadata retrieval - which included the implementation of adaptive search algorithm to find correct bibcodes of publications - and a frontend which provided a 3D interface for the visualization. Our team was placed in the top 10 of the participant IITs. QUARKS TO QUASARS; While students initiate sci-talk in Boltzmann sessions, the professors from different backgrounds of science reign in Quarks to Quasars, a lecture series that has organized various enthralling talks by professors like Prof. G.Srinivasan, Prof. Suresh Govindarajan, Prof. V Balakrishnan, Prof. L. Sriramkumar and Prof. Avinash Deshpande. Current heads of the horizon club are Aditya Mohapatra and Aadyot Bhardwaj.
Projects under horizon in the year 2023-24

Epidemic Modelling Theory and Simulations - We study the spread of epidemic using compartmental models governed by Differential equations. These equations are coupled and sensitive, we analyze the parameters they are governed by which relate to real-world decisions. We compare the sensitivity of parameters which affects the policymaker's decision. Then we move to the physics of it, studying stability analysis and phase plots and studying the similarities to chaotic dynamical systems. Some learning outcomes are Solving Differential Equation in Code, Parameter estimation methods(Least Squares , MLE etc), Data Analysis , Visualization and Simulations, Python , Research paper reading. Some learning outcomes can be Solving Differential Equation in Code, Parameter estimation methods(Least Squares , MLE etc), Data Analysis , Visualization and Simulations, Python , Research paper reading

Spectal Analysis - This projects mainly focuses on how spectra of stars can be used to study the evolution of stars. Our main focus would be main sequence stars.We will study the temperature, metallicity, category of different stars and try to understand the relation betwen these parameters and the evolution and death of stars. If time permits, we can also look into globular clusters of Milky Way. The knowledge gained through this project will be crucial for anyone interested on astronomy or astrophysics. The intuition necessary to do research will be developed through the

project. Basic knowledge in physics, maths and computation would be enough. Some learning outcomes can be stellar evolution, equation of states of massive stars, empirical relation between the properties of stars, HR diagram, computation of different properties, multiple python package, github, research temperament
Stellar Snap: Adaptive Processing is Astrophotography - Adaptive filtering of long exposure astronomical images using different filters and metrics and analyzing them. Monitoring SNR and if possible different metrics and based on that discarding images. Exploring different statistical methods for that. Designing filters for reducing noise related to various effects we face. We will further dive into doing real-time planetary imaging by processing with a computer. And using different algorithms to combine multiple small exposure images based on the metrics. Some learning outcomes can be Working with digital filters, signal processing, image processing, Open CV, Adaptive filters, Taking images with Telescope.
Astrophysical Stellar Simulator (AstroSim) - This is a collaborative project of both horizon and programming club. We simulate different astronomical systems like solar systems and galaxies to try to find out the conditions needed for their formation and how they evolve with time. To achieve this, we will model them systems as N-body systems, solve for their motion in C++, and finally animate them in a software like Unity. As these computations are very resource intensive, we will experiment with different optimzation algorithms to speed up these simulations. Some learning outcomes can be Numerically solving coupled differential equations, Evolution and formation of stellar systems, N-body simulations, Programming in C++, Object Oriented Programming, parallel programming, approximation-based optimizations, and version control using GitHub.

Product Design Club-

The Product Design Club of IIT Madras started as an interest group of student innovators in 2019. In 2020, the “Product Design Group” was officially bracketed under CFI as the Product Design Club. The vision of PDC is to develop a culture of design thinking and user-centric product development in the institute through Design Challenges, Impactful Projects, Workshops, and more.
At the PDC, we are excited by technology and the liberating impact that it can have. We are equally driven by problems that matter, Our projects always strive to solve high-impact problems and meet unmet needs. Some achievements are OUR WORKSHOPS; We run a workshop on Entrepreneurship, Creativity, Product design in CFI’s annual summer school, apart from that we create content on product design on our YouTube Channel and run design thinking workshops which are inspired by the frameworks set by IDEO. FRESHIE DESIGN CHALLENGE; This is our flagship event that we conduct every year to introduce freshmen at IIT M to the world of product design through Fusion 360. Participants have the opportunity to come up with creative ideas to solve everyday problems and bring it to life using 3-D Modeling. The current heads of this club are Bharath Mohan and Swathi Saravanan.
Projects under product design club in the year 2023-24 are
Dot Reader - Building a compact device that emulates a Braille book using electronic sensations as Braille dots, and can store multiple text-based documents. This eliminates the need for printing Braille books which is very tedious and expensive. Some learning outcomes can be CVI, signal processing, circuit design, UI/UX, 3D modelling.
FABT - A smart personal finances logger, which can provide a breakdown of the spending (via visualizations and statistics) as well as provide sound financial advice using AI based on an

individual's spending patterns to spend and save better. Some learning outcomes can be AI models, UI/UX design, Webops, Product development.
Smart Cycle lock - To make a cycle lock with an inbuilt tracker system and proximity meter. The lock will also have a motion sensor that will automatically engage the lock if the cycle is not moving for a certain specified time. We will also be developing a mobile app to incorporate certain features of the lock. Some learning outcomes can be Electronics, Circuit design, App develpoment, Mechanics.
Agriscape - To build specific tools and types of equipment that could help farmers with sowing seeds effectively in a uniform distribution and also weed the fields for specific crops like Pulses,wheat,cotton etc. and solve the issues faced by the farmers who have small or medium farmlands. Some learning outcomes can be Design Thinking, Product Development, CAD modelling, Mechanics, Experience in doing field studies.
Agriscape - This is a collaborative project with Product Design Club(PDC) and Team Sahaay. To build specific tools and types of equipment that could help farmers with sowing seeds effectively in a uniform distribution and also weed the fields for specific crops like Pulses,wheat,cotton etc. and solve the issues faced by the farmers who have small or medium farmlands. Some learning outcomes can be Design Thinking, Product Development, CAD modelling, Mechanics, Experience in doing field studies.
RePower - This is a project continuing from the year 2022-23. To build a cost-effective electric cycle conversion kit that is extremely easy to attach to any cycle with minimal modifications and has regenerative braking capabilities to increase cycling range. Some learning outcomes can be Battery design, motor control and design, electric vehicle optimization.

Programming club-

If you've ever wanted to unravel the dusty treasure chest of algorithms, there can be no better place in insti. Join us for a pleasant walk in the park of algorithms, marveling at the structures that are so creatively constructed to organize data and extract useful information from it. We conduct regular sessions to insti the culture of the challenging mind sport of competitive programming, training students towards ICPC and other prestigious contests.
In ever-changing times, machine learning has risen to be an armageddon against problems faced by society. It has also been proved to be a handy tool for forecasting and mathematical modeling. To nurture and cultivate this skill, we offer club-sponsored projects. The most recent one focused on simulating the motion of multiple planets under mutual gravitational force. Some achievements are ICPC 2021
ACM ICPC (International Collegiate Programming Contest) is an annual multi-tiered programming competition among the universities of the world. The Team Evil Geniuses secured the third place in the Gwalior-Pune regionals round of ACM ICPC. The team also secured 6th position at Amritapuri regionals round of ACM ICPC among 500+ Teams from colleges that had participated from all around the country.
ICPC 2019
The Team GeometryIsLove bagged the second place in the Kharagpur regionals round of ACM ICPC by CodeChef .It paper writers The team has also qualified for the ACM ICPC World Finals to be held in Porto, Portugal in April.
ICPC 2018

ACM International Collegiate Programming Contest is an annual multi-tiered programming competition among the universities of the world. In the Gwalior region, team Supercalifragilistic secured the 2nd position amongst 98 teams. This certainly guarantees a spot for IIT-M at the World Finals to be held in Beijing.
Projects under programming club(PC) in the year 2023-24 are
Algorithmic Trading Platform - Server (Exchange) - We use Boost.asio to implement a low latency server which will receive and order requests from users maintain the orderbook. The project has a very large scope, our primary aim is to receive orders and send confirmations when the orders are fulifilled, this will require us to parse HTTP requests, maintain user information, process placing/cancelling orders and fulfilling orders. We will also try to implement encryption if the primary goals are achieved. Some learning outcomes can be Low level Socket programming, Basic Data structures and Algorithms, Object Oriented Programming, Modern C++, Network Performance Profiling, Understanding how exchanges work and low latency is acomplished.
Algorithmic Trading Platform - Algorithm Implementation - In the past decade, there has been a lot of research on various algorithms, and we aim to implement these algorithms cleanly and efficiently and test them out in market simulations. Refer to the following talk to understand what we aim to do. Apart from this we will also be reading various papers or resources on how random processes work and the generation of synthetic market data for backtesting purposes and implementing them and will try to create our own trading strategies as well. Some learning outcomes can be Basic Data structures and Algorithms, Quantitative Finance, Object Oriented Programming, Modern C++, Understanding of Financial Markets, Modelling, Analysis and benchmarking parameters for trading strategies.
Cache Oblivious Algorithms - We implement a cache oblivious priority queue as propsed in this paper followed by rigorous performance analysis using various perf tools. Later we then implement algorithms such as Djikstra SSSP using this priority queue. We compare the performance implementation with other SSSP implementations. Some learning outcomes can be Basic Data structures and Algorithms, Object Oriented Programming, Modern C++, Performance analysis, Benchmarking, Reading Research Papers.
Astrophysical Stellar Simulator (AstroSim) - This is a collaborative project with Horizon club and PC. We simulate different astronomical systems like solar systems and galaxies to try to find out the conditions needed for their formation and how they evolve with time. To achieve this, we will model them systems as N-body systems, solve for their motion in C++, and finally animate them in a software like Unity. As these computations are very resource intensive, we will experiment with different optimzation algorithms to speed up these simulations. Some learning outcomes from the programming perspective can be Programming in C++, Object Oriented Programming, parallel programming, approximation-based optimisations, version control using GitHub, Numerically solving coupled differential equations, Evolution and formation of stellar systems and N-body simulations.

Team Sahaay-

Team Sahaay, as the name suggests was founded to develop technological products and to provide technical solutions to assist specially-abled people in their daily lives. The vision was to establish a team of enthusiastic students who would collaborate with various NGOs and work towards the development of technologies as solutions that greatly impact society.
Over the past few years, they have broadened our focus to provide interdisciplinary technical solutions to wider social problems, including, but not restricted to sanitation, waste

management, protection for the elderly, differently-abled and women, environmental challenges, and arthritis rehabilitation.
Team Sahaay works on developing innovative, frugal technological solutions to a wide variety of social problems ranging from sanitation to healthcare to assistive devices for the differently-abled. Some achievements include ASSISTIVE CHAIR FOR ARTHRITIS REHABILITATION; Increasingly hectic lifestyles have resulted in numerous lifestyle-related diseases like obesity, diabetes, etc. This has led to drastic changes in how people view fitness. India's fitness and wellness industry is worth 1.1 billion $ and is growing at an annual rate of 25%. But, the majority of people don't work out regularly due to hectic office hours or lack of fitness centers in nearby areas. The team planned to develop India's first AI-powered workout solution which can give personalized health recommendations to users. AUTOMATIC WASTE SEGREGATOR; One of only 50 teams globally selected for the Singapore Regional Finals of the Hult Prize Silver Medal, 7th Inter IIT Tech Meet, 2018. This project aims to solve one of the perennial problems of both India and the world, i.e, improper/partial waste segregation. The team's first prototype, codenamed AWSOne (Automatic Waste Segregator 1) used a robust mechanical system coupled with the latest technology in the fields of Deep Learning, Computer Vision, augmented with capacitive and inductive sensors to relay an accuracy rate in the identification of waste as one of four main categories viz. Metal, Plastic, Glass and Organic, and then segregate the waste into the appropriate. RESTROOM SEAT SANITATION; One of the biggest challenges with public toilets is their sanitation and maintenance. This is when a mechanism for toilet seat sanitation was developed by Arvind Pujari, Kushal Kumar Reddy, Shashwat Jain, Subham Kumar Sahana, and Tanay Garg under Team Sahaay which was also appreciated by Gandhian Young Technological Innovation in 2017. The news also was published in the Times of India. The current heads are Pranav Yadav and Rishi Nandha V.

Projects under team Sahaay in the year 2023-24 are-
Project Vision - An Assistive Device to re-imagine mobility for the Blind. Some learning outcomes can be Computer Vision, Electronics, 3D-Modelling & Mechanical Design, Launching an Assistive Technology Product.
Blue ResQ - Building a Web Application in collaboration with Blue Cross to report Animal Accidents and Rescues with a decentralized system for the respondants to quickly get notified. Some learning outcomes can be Launching an app, Generating Impact on a day-to-day Social Problem, App development, Web development.
Pestokart - A low-cost pesticide spraying cart that requires minimum manual effort for Indian farmers. Some learning outcomes are 3D Modelling & Mechanical Design, Material study, Field Studies on Agricultural lands.
Vass.AI - Building a set of spectacles that scan the surrounding soundscape for danger and reports it visually to an auditorily-impaired user. Some learning outcomes can be Audio related Machine Learning, Electronics, Launching an Assistive Technology Product.
AgroScape - A set of tools designed for small-scale farmers to whose fields the existing technology aren't feasible. Some learning outcomes can be 3D Modelling & Mechanical Design, Field Studies on Agricultural lands. This is a collaborative project with PDC(Product Design Club) and Team Sahaay.

Team Envisage-

The Annual Technical Festival of IIT Madras, Shaastra introduced a technologically aided cultural show in the year 2013, capitalizing on the entertainment factor. This techno – cultural show was named Envisage and today it is India's first and only student organized techno-entertainment show. The projects exhibited by Envisage attract a bunch of not-so-technically oriented guests too. The projects are designed in conformity with the tagline of Envisage – "Technology meets Entertainment". Alongside conducting the show on 1st day of Shaastra, a number of other interactive projects and video games are also developed and exhibited to a vast crowd at KV Stalls during Shaastra. Over the past few years Envisage has been exploring and presenting projects at various avenues like IIM Bangalore, Anna University and in several other universities as part of Samparks, Publicity event of Shaastra. The coming version marks the entry of Envisage into its very 10th year.
As the tagline "Where Technology Meets Entertainment" suggests, we inspire and enable students to explore their creative and engineering skills through various technical projects for the techno cultural show and the tech exhibition during Shaastra. Current heads of team envisage are Nalla Harshitha and Arjun Balamurali.

Webops and Blockchain Club-
We are CFIs newly reformed club. A team of students who are passionate about Web Development and Blockchain. We use cutting-edge technology to develop sustainable solutions for real world problems. Our vision is to develop education, community and innovation based on blockchain technologies (blockchain is a system of recording information in a way that makes it difficult to change, hack or cheat the system) and web operations. Our mission is to actively facilitate understanding of web development and Blockchain technology through group discussion, organized events, guest speakers and undertake projects. Some achievements of the club include LAUNCH OF INSTISPACE; A community centric application oriented to solve problems of all students at IIT Madras. With its sections i.e. feeds,forums,lost and found and academics ,users problems like scrolling through smail for relevant information,connecting to people,keeping track of their courses and to check whether the mess menu is worth eating is solved. We intend to make this application address every possible issue a student might face studying and living in IITM. STUDENTS OF WEBOPS AND BLOCKCHAIN CLUB CONDUCTS THE FIRST EVER BLOCKCHAIN BASED ELECTIONS IN INDIA; Our team embarked on the development of a blockchain-based voting system driven by our collective desire to revolutionize the electoral process. Recognizing the inherent challenges in traditional voting methods, we sought to enhance transparency, security, and immutability by harnessing the power of blockchain technology. By successfully conducting elections in our college using this innovative system, we not only demonstrated its effectiveness but also earned the distinguished honor of having our achievement registered in the India Book of Records as the first-ever blockchain-based election conducted in India. CHENNAI WATER LOGGING: AN INITIATIVE TO CREATE A REAL-TIME FLOOD MAP; A platform that enables the public to report water logging details across the Chennai region. The data gathered through this platform aims to improve disaster preparedness and response in communities by gathering, sorting, and presenting data of flooding reports. This Crowd source data, curated through this platform will help to

understand the reasons for waterlogging / inundation and help IIT Madras researchers to develop / design remedial measures that may be recommended to GCC, PWD and other relevant Govt. departments for their action. LAUNCH OF CLINSTI APP; This year we successfully launched the all new CLinsti app – a mobile application developed by the joint efforts of Engineering Section and CFI to promote cleanliness and ensure proper waste management in IITM campus. It was launched in October 2021 and is available in both Appstore and Google Play Store and it got over 200 downloads within a month of its release. Current heads of the club are Rasagnya, Satwik Anand and Akshay Pratap Singh.

Projects under webops and blockchain club in the year 2023-24 are
Inventory management using blockchain - Blockchain based solution for managing funds provided by the institute. It will keep track of where and how much funds are used by different clubs and organisations. Some learning outcomes can be web2, react.js, web3, ethers.js, hardhat, blockchain, solidity.
Code Catalog - A tool that generates documentation for code by analyzing source code files and extracting comments and metadata and include dynamic code snippet runners that allow users to run code examples within the documentation. Some learning outcomes can be Web development, NextJs, Web Assembly UI/UX, project management.
Udaan - First Responder - UDAAN represents a set of aspirations that rests in the hearts of millions of former NCC Cadets (NCC alumni). In this project we will create a web application for the NCC - Udaan organization to develop an exact product that could serve the people in need. in this initiative we would also make a mobile application for the general public in need. This application will act as a bridge between people in need and the NCC cadets who have registered to help, be it disaster management , educational counseling , personalized help ,etc. Thus we'll be exploring both the domains of app and web development. Some learning outcomes can be React, Nextjs, Node, Express,Flutter,UI/UX.
Universal Credit System - Maintaining credits across multiple course platforms has become a strenuous process, since different institutions follow different systems. A universal system for being able to accredit any course from any platform, can be built. The credits can be given to students by delegated members on the chain who have certain additional powers, and all transactions are recorded on the blockchain. Hence, the entire academic record of a student until his/her education finishes can be managed. This portal can be a personal website of the student, connected to a blockchain, using a Web3 domain name. DIDs(Decentralised unique identifier),VCs(Verifiable Credentials),Research oriented,Private & Public Blockchain knowledge.
Travel App - An application to simplify the travel planning process by analyzing all available routes and providing users with the most efficient and cost-effective options based on their preferences and requirements. Some learning outcomes can be App development, Flutter, Alogorithm design, UI/UX, project management.
Blockchain based Loyalty Program - Improving the existing loyalty programs using Blockchain based loyalty tokens and digital wallets.Digital Wallet will be one point acces to all your Loyalty points which will be stored in the form of Loyalty Tokens. Some learning outcomes can be Private Blockchain,golang for chain codes,Research oriented,Hyperledger.
InstiSpace - IIT Madras students can use the app Instispace to assist them in their daily lives. With its feeds section, which allows various clubs to post their events, recruitment, announcements, and other information with specific tags, users who follow these tags are notified, ensuring that users receive information that is relevant to them and that clubs can reach their target audience. With sections like lost and found and forums, users can interact with almost everyone else in the institute, strengthening the bonds between students. With the addition of new features including

Acads, Mess, and Timetable, we have assisted users in resolving daily problems. Instispace will become a one-stop solution for all of the issues students encounter. Some learning outcomes can be App development, Flutter,Nestjs,postgres,typegraphql apis, UI/UX, project management.

AI Club-
The AI Club is a new club, introduced under the CFI umbrella formed by the merger of the previous two clubs: Analytics Club and CVI Club creating a unified venture that encompasses a broader scope of artificial intelligence, and promises even more exciting opportunities for our members.
We're a passionate group of enthusiasts committed to tackling real-world challenges through the power of AI.
The primary vision of our club is to promote awareness of AI concepts and build an inclusive environment that exposes the student body to the field of AI. Some achievements include INTER IIT TECH MEET 11.0; Secured podium finish in all Inter IIT Problem sets. Won Gold among all the participating IITs in DevRev (High Prep PS) and Bronze in CloudPhysician, ISRO (Mid Prep PS) events. CISCO CONVOLVE HACKATHON; Winners of Convolve 2023, first-ever pan IIT AI/ML hackathon sponsored by Cisco, with a participation of over 700 teams. ECCV 2022; Published a paper on crack detection at the European Conference on Computer Vision (ECCV) in 2022 at Israel. THE TURING PRIZE (NOW AI ALIGNMENT AWARDS); The Turing Prize, in collaboration with the Analytics Club IITM (now merged with CVI to form the AI Club) conducted sessions on AI Alignment over 4 days for the general student body with over 400+ attendees. Current heads of the club are Ruthwik Chivukula, Srikar Babu and Karthick Krishna.

Projects under AI club in the year 2023-24 are
Text2Scene - Implementation of a photoshop tool to generate photorealistic changes. Some learning outcomes can be GANs, VQA, Harmonization.
RL Games - Training an agent to play various games like Mario, Minecraft using RL techniques.Usually RL Agents take millions of steps to learn simple games, here we will try to imrpove algorithms based on research papers so that they can learn complex games in less time steps. Some learning outcomes can be -Reinforcement Learning Algorithms -Deep RL using Neural Networks.
OptiWing - Reverse engineering airfoil shapes based on pressure distribution data, and optimising them for better performance. Some learning outcomes can be -Convolutional Neural Networks, Deep Neural Networks, GANs.
SpikeDrive - Object Tracking using Spiking neural networks. SNNs have the potential to enable efficient processing of sensory information, thereby improving the accuracy of object detection and tracking. Some learning outcomes can be Event data, Spiking Neural Network Architecture, Spiking Time Dependent Plasticity algorithms.
Deepfake Detection - The goal of the project is to build innovative AI models that can help detect deepfakes and manipulated media. This project is in collaboration with Hyperverge. Some learning outcomes can be Various Convolutional Neural Network (CNN) Architectures, Convolutional vision transformers.

AI Choreography - Generating cool, physically plausible and robust dance moves based on the provided music. Some learning outcomes can be GNNs, transformers, attention mechanisms, diffusion models.

BioTech Club-
The Biotech Club, born in 2023 as a vertical under iGEM, is a group of passionate individuals determined to showcase the wonders of biotech to the student community. Our vision is to create an inclusive interdisciplinary haven where students can explore exciting ideas and endless possibilities in biotechnology. The club organizes a series of captivating events and engaging workshops to stimulate your brain, facing those ideas that keep you up at night (zombie apocalypse, anyone?). Apart from this, the club undertakes student projects in biotechnology. At the Biotech Club, the only prerequisite is a deep-seated desire to dive into biotechnology. The club offers a haven for anyone looking to get their hands dirty, ideate and dig deep to come up with solutions. Together we'll turn dreams into reality, one DNA strand at a time! The current heads are Aditya Ray and Raghav.

Projects under BioTech Club in the year 2023-24 are
Artificial Immune System - Diagnosing Parkinson's using Immune-Inspired Algorithms: We aim to use Artificial Immune systems (AIS) which are analogous to Artificial Neural Networks(ANNs), to diagnose Parkinson's Disease. We intend to use an algorithm to analyse healthy handwriting samples. Some learning outcomes can be Modelling neural networks, unconventional approaches to computing, analysis of human immune system, information processing.
Biolumos - Creating a bioluminescent street lamp: We aim to develop a self-sustaining microbiome using modified E.coli strains (like a terrarium). This biome will be present inside the lamp and provide the lighting solution. We aim to make a renewable light source through this project. Some learning outcomes can be Metabolic Modelling, Flux Balance Analysis, Genetic Circuits, Logic Gates, Biome Design, Genetic Firewalls, Genetic Engineering.

Mathematics Club-
Mathematics club, CFI is a group of motivated and enthusiastic students conducting research on various topics in the field of Mathematics and aiming to develop a thriving Math culture. Started in November 2022, our team has conducted numerous workshops, problem-solving sessions, and contests, including our flagship event Integration Bee. Our areas of research include Probability and Statistics, Calculus, Game Theory, Galois Theory and Group Theory. Some projects they have done are INTEGRATION BEE; We conducted our flagship event, IITM's own Integration Bee in April 2023, in which over 150 students participated. Participants had a lot of fun solving some fancy integrals using common techniques like substitution, limit of sum, contour integrals, power series, and more! PROJECT ON MONTE CARLO SIMULATIONS Our first project on Monte Carlo Simulations involved numeric simulations of probability problems which cannot be solved analytically. Among the few projects in CFI to include freshmen, we came up with solutions to problems like natural selection and genetic drift, Arrhenius equation, and Kepler's law for arbitrary potentials.

Projects under Maths club in the year 2023-24 are
Conceptualization and Design of Permutation Puzzles - This project involves research and a deep understanding of different kinds of permutation based puzzles using group theory. Some

examples are the rubix cube, pyraminx and megaminx which use different platonic solids, the skewb which uses a cube but allows the corners to rotate independently and the 15 puzzle which is 2 dimensional. Some learning outcomes can be Will learn and understand the basics of group theory and get a firm understanding of how to create an algorithm to solve permutation puzzles (Like rubiks cube, subgroup of S_48). We will also look into some simpler examples like solitare (behaves like a klein 4 group) and the 15 puzzle. We would involve looking at various geometric objects and examining which plane cuts would result in interesting puzzles. In principle we would take a particular group and try to build its mechanical analog through rotations and transformations of a geometric object. This would follow up with a simulation of the puzzle and checking its solvability.
Chaos Playground - This project starts off with a non-linear system based modelling of various dynamical systems. We then extend our analysis to game theoretic topics like Pursuit-Evasion games, Evolutionary Games. This project involves a lot of research around analysis of non-linear systems like Kuramoto oscillators, aerial UAVs, Multi-species Prey predator models etc and later extending its application of various other systems/differential games. Some learning outcomes are we will do an in-depth research on Non-Linear dynamics of various systems and analyse them. We will also be building various dynamic/differential games that have algorithms and solutions involving the analysis of Non-linear dynamics, indulging more on game theoretical aspects. In the end, we will also simulate our analysis over a wide range of research findings and possibly aim at publishing a paper.

Competition Teams

Team Raftaar:
Raftar is a team of 40+ students from different disciplines in IIT Madras with a shared passion for automotive engineering and motorsports. Every year, the team takes up the challenge of building a swift Formula Student race car and works to become the most competent and cohesive team of engineers in the nation. Working at the Centre For Innovation, IIT Madras, Raftar aims to become a globally competitive team and promote the Formula Student culture in India. With a flair for technical finesse and innovation, we strive for continuous technological advancement and competitive glory at Formula Student events around the world. They are working on building a formula type car, currently electric, in the previous years, it has worked on building IC engine based formula cars

Team Avishkar
The team started as a student project at the Center for Innovation, IIT Madras. In the short time since inception, we proved our mettle at international Hyperloop competitions. We were the only Asian team at the finale of SpaceX Hyperloop Pod Competition 2019. Then, competing virtually in European Hyperloop Week 2021, we won the 'Most Scalable Pod Design' award by Zeleros Hyperloop and were in

the global top-5 in Mechanical, Propulsion and Levitation award categories. We built our latest pod Avishkar 5.0, during the pandemic through relentless effort. Avishkar 5.0 Pod is equipped with many novel technologies that we built in-house from scratch and emerged in the global top 5 in 3 categories - Electrical Subsystem, Traction Subsystem and The Complete Pod Category in the European Hyperloop Week 2022. This year, through meticulous planning and design, we built the Pod 6.0, Garuda. Improving on the existing technologies through various testing methodologies, incorporated with other intricate technologies with immaculate provisions, Garuda stands as Asia's most advanced pod. We emerged Top-3 in the Socio-Economic Aspects of Hyperloop Development Category, Top-5 in the Sense and Control Category and Top-6 in the Guidance Category in the European Hyperloop Week 2023 held at Edinburgh, Scotland.

Currently, we have expanded our horizons and are focusing on taking a giant leap. We are aiming to build a 400m long vacuum tube facility at IIT Madras and establish a Centre for Hyperloop Excellence at IIT Madras in collaboration with the Indian Railways and L&T Constructions. We also intend to conduct a Global Hyperloop Competition at IIT Madras at the 400m vacuum tube facility making India a global center for Hyperloop Research. They are working building a hyperloop.

Team Anveshak

Team Anveshak is a group of more than 30 enthusiastic students from IIT Madras who are dedicated to the field of robotics. We are passionate about building remote operated all-terrain rovers that come with a robotic manipulator and digger. Since our inception in early 2016, we have spent countless days and nights perfecting our craft. Recently, we celebrated our seventh anniversary & are proud of the incredible journey we have had so far. Join us as we continue to explore the exciting world of robotics. Our team brings together a set of highly dedicated & skilled students working on mechanical design, system architecture & control, outreach & business relations. We also organize educational workshops for students of our institute on different aspects of robotics. The technical knowledge & practical experience the team imparts to its members is unparalleled, nurturing them into effective team players & leaders of industry & research. To test ourselves on the global stage & to learn from the best in the business, our team participates in the University Rover Challenge(URC), an international robotics competition geared towards space exploration & research. URC is a project of The Mars Society aimed at promoting space technology research & development amongst students across the world, by challenging them to build the next generation of Mars rovers. Several teams from the top universities of North America, Europe, Asia and other parts of the world compete in this challenge which tests their rovers in the extreme conditions of the Mars Desert Research Station, which is akin to Martian terrain. From qualifying to participate in the European Rover Challenge(ERC) 2016 to actually finishing as champions of Indian Rover Challenge(IRC) 2019 and finally finishing in the top 12 positions in University Rover Challenge(URC) 2019 , we as a team have grown at a rapid pace & have learned & improved at each stage. In Our long term vision, we hope to collaborate with the top research organizations of India such as the Indian Space Research Organization(ISRO) & the Defense Research & Development Organization(DRDO) in building truly world class technologies for all. They primarily work in building mars rovers.

Team Abhiyaan

Team Abhiyaan is an enthusiastic group of multi-disciplinary students of IIT Madras, committed to building intelligent, robust, precise and safe ground navigation systems. The team comprising 45 members is based in Center For Innovation (CFI), IIT Madras which provides a platform for

creative ideas to be realized into ground-breaking product prototypes and revolutionary business models, with mentoring from the industry, faculty and alumni. They primarily work on building autonomous vehicles.

Team Abhyday

They intend to make a mark in the 2022 Spaceport America Cup. Our team is made up of students from a wide variety of disciplines, all wanting to push India to the next phase of rocketry. We would be shooting up our rocket 'Mocking-Jay' up to 10,000ft in New Mexico, USA in the month of July. CFI can proudly say, that students do rocket science in cfi. Abhyday primarily

work on building rockets.

Team Agnirath

Agnirath is a team of young brains, with a vision to contribute to the sustainable future and the will to push the engineering limits, attempting to make solar EV hybrids a reality. We are one of the first Indian teams participating in the prestigious World Solar Challenge, competing with teams from top universities across the globe! They work on building solar powered vehicles.

Team iGem

iGEM, IIT Madras is a group of individuals passionate about the fascinating field of synthetic biology. We participate in the International Genetically Engineered Machine competition every year. The 'machines' at work here are the small, yet incredibly complex bundles of life growing on a Petri plate! Teams from around the world compete by addressing daily issues with their designs of engineered biological systems. The goal of the competition is to develop an international collaborative community for the growing field of synthetic biology. IIT Madras has a long history with iGEM as well, having taken part in more than ten editions since 2008, and has received numerous accolades at the international stage

Some general stuff about CFI

Clubs are student teams under CFI which work on co-curricular activities related to the theme of the club. The club shall strive to promote their theme in the co-curricular sphere of the institute.
Roles and Responsibilities:
1. Club Faculty Advisor:
a. Shall act as the faculty in charge of the club
b. Shall advise the club in the activities that it plans
c. Shall advise the club on the projects under it
2. Club Head:
a. Shall plan and manage the activities of their respective club
b. Shall be responsible for maintaining and documenting the technical inventory of their respective club
c. Shall call for members from the GSB to work on projects under the club
d. Shall be responsible for managing the projects under the club along with the project management team
e. Shall maintain detailed documentation of all the projects under the club f. Shall act as the representative of their respective club in the CFI Core Team
3. Coordinators:
Shall be responsible for the execution of the various activities planned by the club

Project Management Team
A. Responsible for the ideating and executive new initiatives in CFI
B. Responsible for ensuring the availability and maintenance of the facilities and tools required for the working of projects
C. Responsible for managing, reviewing and assessing various projects under the clubs in CFI.

Finance team of CFI is responsible for managing the finances of CFI
The Media & Outreach team are responsible for the publicity and coverage of CFI activities
The Design Team is responsible for the creative and design requirements of CFI and the teams under it. Shall be responsible for timely delivery of the creative articles like posters to the respective teams.
Nirmaan is the pre-incubation cell of IIT Madras. Nirmaan may select, provide funding for and guide promising ideas/startups/business ventures put forward by the student community.

CFI Managerial Team consists of branding and engagement team, finance team, project management team and sponsors team.

Branding and engagement team -
The Branding and Engagement team handles the front-end of CFI. The vision of the B&E team is to build the CFI brand among its internal and external stakeholders and engage the student community with the co-curricular sphere. Our major operations include managing Publicity and Media relations. We stand as the backbone behind all the activities, events, and sessions held in CFI. We have the responsibility of maintaining all the Social Media handles of CFI including Instagram, LinkedIn, Twitter, and Youtube and curating content for the CFI Website. B&E is also engaged in Alumni and other stakeholder outreach, handling visits and related follow-ups. We

take care of the ambience and handle CFI Open House alongside the Project Management Team. We ensure healthy inter-team interaction through fun and engaging activities. It is currently headed by Angela Roy and Himavarshini.

Finance team -

CFI provides a platform for the students to showcase their project ideas and to see them through the whole process of converting it into an actual product, by providing them with a workspace, comprehensive inventory and guidance and assistance whenever necessary. The finance team acts as a bridge between the administration and the students. We help in efficiently using the funds provided by the institute through various ways and assure that all the resources are utilized at its best and there are no discrepancies in the data provided by each and every team. Being the senior most managerial team in CFI we also make sure that all the major events of CFI like Open House and Summer School goes smoothly. It is currently headed by Ratan Danush and Revati Sawant.

Project Management team-
Project management team looks after the progress of the projects and acts as a helping hand to the clubs. The PM team plays an important role in conducting CFI events which involve engaging the student community, faculty, outsiders, industries etc. A few of these major events include Open house, CFI Orientation, Summer School, etc. The team is responsible for managing the logistics of the sessions and events. Some of the major operations of the team include compiling data in summer school, conducting open house by procuring all the requirements, conducting PM reviews and helping the clubs (or teams) with their necessities. It is currently headed by Tarun Seetha, Asharam Khatik and Sai Charan.

Sponsors team -
It is responsible for bringing sponsors for projects and other team specific requirements in CFI.

SIP (Student Innovation Portal)
This is a way of selecting problem statements for CFI club projects. It's a portal open for a fixed period of time, opened at the start of a new tenure. Students can upload their project ideas and explain what are the deliverable outcomes of the project, potential of becoming a startup, technical feasibility and few other parameters. If it's good, then it can be taken as a project idea under the club relevant to the selected problem statement.
Other ways of selecting problem statements for club projects can be club proposed projects, professor or industry collaborations.