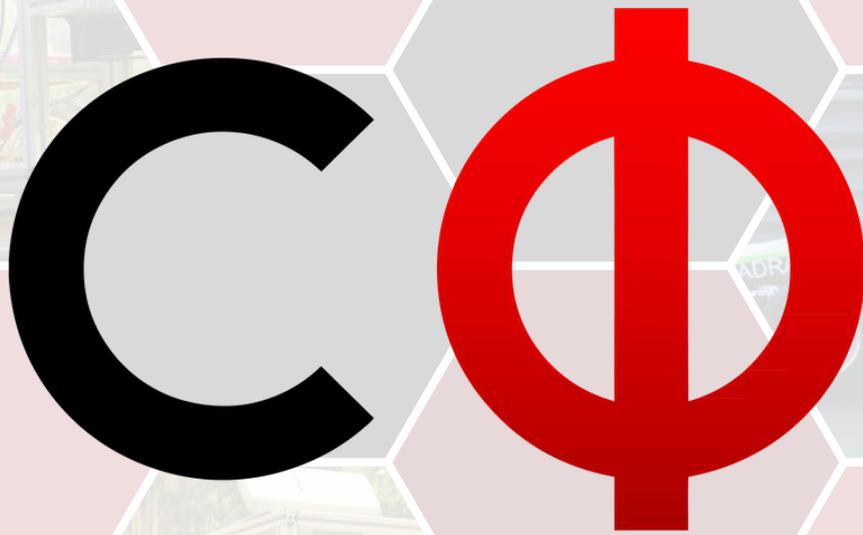




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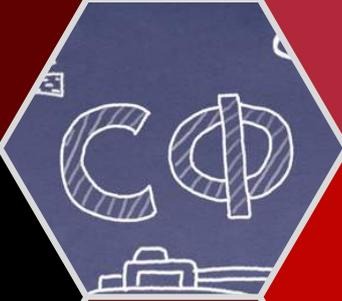
# Centre For Innovation



Centre For Innovation

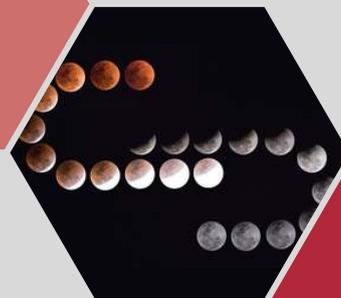
## Annual Report

### 2017-18



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# CFI 2017-18 Managerial Team



From the Top;  
First Column: Chirag, Vivek, Nikhil  
Second Column: Gaurav Lodha,  
Raghav, Aboo, GPK Prasanth  
Third Column: Shanttam, Arvind,  
Rajiv

THE CLUBS OF CFI  
FORM ITS BACKBONE  
AND GROUND US IN  
THE FUNDAMENTALS...



<b>3D Printing Club Head</b>	Lokesh Kumar
<b>Aero Club Head</b>	Aditya Vinod
	Ashutosh
<b>Analytics Club Head</b>	Sanjay Kumar M
<b>Auto Club Head</b>	Harish Balaji
<b>Astronomy and Physics Club Head</b>	Somayajulu Dhulipala
	Amit Srivastava
<b>CVG Club Head</b>	Aravinth Muthu
	Sidharth
<b>Elec Club Head</b>	Tarun
	Chandrahaas
<b>iBot Club Head</b>	Adarsh Somayaji
	Saurav Bloor
<b>Team Sahaay</b>	Tanay Garg
	Subham Kumar Sahana
<b>TechnoEntertainment Club</b>	Deepanath C
	Abhishek Kelkar
<b>Social Entrepreneurship</b>	Samyak Jain
<b>Programming Club</b>	Narayan

# THE COMPETITION TEAMS ADVANCE US FORWARD...

<b>Raftar Heads</b>	Aishwary Gupta
	Johaana
<b>Abhiyaan Heads</b>	Ravi Theja
	Narendiran
<b>Anveshak Heads</b>	Riddhi
	Akshay
<b>Amogh Head</b>	Nived Rajaraman
<b>Avishkar Heads</b>	Suyash Singh
	Ankit Kukadia

## THE END PRODUCTS OF CFI...

<b>Nirman Head</b>	Sambit Mishra
<b>Industry Connect Team Head</b>	Akash Ramdas

## AND OUR TIRELESS BACKEND TEAMS...

<b>Finance Core</b>	Nitin Srikar
	P Sai Prashanth
<b>Concept and Design Cores</b>	Anshul Kumar
	Vaibhav Nayel



# THE YEAR THAT'S BEEN..



Right from breaking old records to creating new ones CFI has surpassed all its previous milestones and shown throughout the year in more instances of showcase than ever before in the history, with 4 patents to its name.

Whether it's been setting the Asia and India record for the "Largest Number of Robots Cleaning a Floor" and obtaining massive national media coverage, or producing several national and international award-winning projects, or even conducting one of the largest and most successful CFI open houses in the history, we at CFI have achieved tons to be proud of this year.

Topping this year with IIT-Madras conducting the 6th annual international Inter-IIT-Tech Meet, where the CFI Core Team was responsible for the planning, organisation, and execution of the event right from sourcing socially and industrially relevant problem statements up until obtaining exemplary judges and conducting the first ever Engineer's Conclave.

Thanks to Director **Prof. Bhaskar Ramamurthi**, Dean of Students **Prof. MS Sivakumar** and Dean IAR **Prof. Nagarajan** for their support. Special thanks to our faculty advisors **Prof. B Ravindran** and **Prof. Bobby George**, the faculty advisors of all our clubs and competition teams for their continuous and invaluable mentorship and guidance all throughout the year.

## CLUB

Nirmaan  
3D Printing Club  
Aero Club  
Analytics Club  
Auto Club  
Astronomy and Physics Club  
CVI Club  
Elec Club  
iBot Club  
Team Sahaay  
WebOps Club  
Programming Club  
Team Envisage  
Social Entrepreneurship  
Raftar  
Team Abhiyaan  
Team Anveshak & Team Amogh  
Team Avishkar Hyperloop

## FACULTY ADVISOR

Dr. Mahesh Panchangala  
Dr. G. Saravana Kumar  
Dr. Ranjith Mohan  
Dr. Nirav Bhatt  
Dr. S. Soundarapandian  
Dr. Suresh Govindarajan  
Dr. Kaushik Mitra  
Dr. Deleep Nair  
Dr. Asokan T  
Dr. Anil Prabhakar  
Dr. Jayalal Sarma  
Dr. Rupesh Nasre  
Dr. Prabhu Rajagopal  
Dr. R. Nagarajan  
Dr. A Ramesh  
Dr. Sathyan  
Dr. T Asokan  
Dr. Bobby George and Dr. Prabhu Rajagopal

So here's wrapping up the year with a noteworthy summary, and to wishing the next team a greater round of success and achievements.

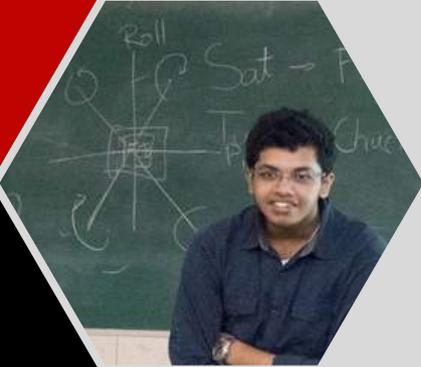
Cheers!

Gaurav Lodha

CFI head 2017-2018



# SEMESTER CLUB SESSIONS



club session count: 2017-18

3D PRINTING	3
AERO	3
ANALYTICS	3
ASTRO/PHYSICS	14
AUTO	2
CVI	10
ELECTRONICS	8
iBOT	8
PROGRAMMING	14
WEBOPS	3

# ARTEMIS: RAILROAD CRACK DETECTION BOT

The Railroad Crack Detection Bot, fondly called Artemis, is an innovatively designed modular robot that is actively trying to reduce the number of derailments in the country. The robot uses various sensors to detect the presence of cracks, analyses them and sends instant GPS location updates via SMS. The major high point of the design lies in the 'under-the-track design'. The robot moves independently under the tracks and searches for cracks. The trains can simultaneously and independently move on top of the tracks, thus eliminating any present concerns of delay in train schedule due to maintenance.

**TO AVERT DISASTER**  
The 125-foot-long robot made by IIT-M students can work even when a train is running on the tracks

43 lakh robots could cover total rail length of 1.15 lakh kilometers

Each robot will cost ₹10,000

**THE ROBOT**

- Designed to move on the inside of a track without hindering train movement
- Modular design, easy to remove and change components
- Suspension to enable smooth movement across fish plates
- Battery-powered and solar charged
- Fitted with ultrasonic and T-SOP sensors to detect crack
- GPS module for details
- GSM module for data relay
- Can aid manual track inspection, make it better

**HOW IT WORKS**

- Moves back and forth at 1m/sec
- Sensors fitted above wheels robot detect and send track data to microcontroller
- Controller (microchip) analyses, identifies crack
- Warning signal with GPS data sent out

**Source: IITM** Around 400 gangmen die across the country every year while repairing railway tracks

The project has been well recieved at both national and international platforms: National Runners up in International James Dyson Award, Silver medal at the Inter-IIT Tech Meet 2018 and qualification in the Smart India Hackathon 2018. With a provisional patent approved for the invention, this first of its kind design will surely save precious lives.



# RECORD BREAKING SESSION

On 29th October 2017, students from the Centre For Innovation set the Asia and India Records for operating the "Largest Number of Robots Cleaning an Area."



Representatives from the Asia Book of Records and India Book of Records adjudicated the event, which took place between 6 p.m. and 8 p.m. at the Students Activities Centre (SAC) in the campus.

As many as 270 students belonging to several disciplines fabricated a total of 45 Robots at the CFI Workshop. Each robot consisted of a high RPM motor at its centre, with two rotating scrub pads that directed the dust into the Central Suction Mechanism, which was collected by a filter in the vacuum tunnel.

The robots were controlled over Bluetooth from an App based on the Android platform.

## IIT-M students set record for operating largest number of robots to clean an area

TIMES NEWS NETWORK

**Chennai:** Students of IIT Madras, who developed 45 robots to clean simultaneously for more than 15 minutes, have set the record for operating the "largest number of robots cleaning an area" in India and Asia.

A total of 270 students from across different disciplines participated at the Centre For Innovation (CFI) workshop in IIT Madras on Sunday where the robots cleaned an area of 750sqft simultaneously.

Each robot has a high RPM motor at its centre with two rotating scrub pads that direct the dust into the central suc-



**GETTING THE JOB DONE:** Students with their robots at the Students Activities Centre on the IIT Madras campus on Sunday

tion mechanism, which is then collected by a filter in the vacuum tunnel. The robots were controlled through Bluetooth from an app. No manual inter-

vention was allowed inside the cleaning area after the start of the exercise.

"Such exercises teach the basics of electronics, robotics,

automation, wireless communication, 3D printing, rapid prototyping and software modelling along with soft skills," said Gaurav Lodha, student executive head, CFI, and fourth-year dual-degree student of civil engineering.

Another major aim of this initiative was to spread and strengthen the concept of Swachh Bharat Abhiyan, said the institute. Professor B Ravindran, faculty-in-charge, CFI, said robotics is one of the oldest co-curricular activity at IIT Madras. "This record is the latest in the list of achievements of the robotics groups at the Centre for Innovation," he said.

# RECORD BREAKING SESSION

The robots cleaned an area of 750 sq.ft. simultaneously for more than Fifteen Minutes without stopping to set the Record. No manual intervention was allowed inside the cleaning area after the start of the exercise.

Electronics, Robotics, Automation, Wireless Communication, 3D Printing, Rapid Prototyping and Software Modelling along with soft skills like Teamwork, Time Management, Problem-Solving, Communication and Leadership were taught to the participants, largely freshmen, by the CFI Club Heads.



Another major aim of this initiative was to sustain, spread and strengthen the concept of Swachh Bharat Abhiyan, A Clean India Initiative.



# CFI OPEN HOUSE 2017

The CFI Open House is an annual event conducted by CFI in which various student-initiated projects are displayed to alumni, faculty and industrialists from various fields. The students are provided with a platform to network with experts and facilitators in the field of technology and entrepreneurship.



Months of hard work by various clubs and competition teams of CFI finally paid off on the evening of 8th October 2017, the most important night for all of CFI's Projects, to a crowd of over 2000.

The occasion was inaugurated by the Director, Professor Bhaskar Ramamurthy, and graced by professors, entrepreneurs, industrialists and media. Over 40+ student projects were put on display, like the modular plane, cell segmentation, EM sense, foldable houses, aquatic weed remover, toilet sanitation, etc.



# CFI OPEN HOUSE 2017



This year, the Open House displayed the work of CFI's three internationally acclaimed competition teams: Team Anveshak's Mars Rover, Team Abhiyaan's Autonomous Vehicle and Team Raftar's Racecar. Some of the highlights of this year were exhibits by the James Dyson Award winning Rail Road Fault Detection Robot, the Carbon Zero Challenge finalists: Intelligent Lighting System, as well as ICSR projects, and CFI mentored projects from IIT Tirupati and IIT Palakkad under our mentorship program, Vistaar.

The Open House 2017 witnessed an overwhelming increase in the number of visitors and media coverage, providing great exposure across the country.



# SUMMER SCHOOL

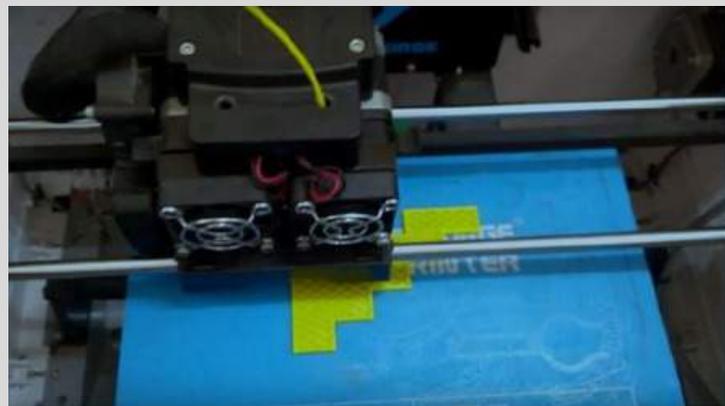
The Summer Schools have been an integral part of CFI activities for the last couple of years. Aimed at providing an all-round exposure to the participants, multiple clubs organise these sessions, spread across the summer.



The Aero Club's 16-day Summer School focused on the basics of aerodynamics, aircraft structures and also provided the necessary expertise for the following hands-on session to build and fly an UAV.

The 3D Printing club's summer school started on 9 May, where students learned how to scan real world objects, perform 3D modeling using CAD software like Tinkercad, SketchUp, Autodesk Fusion 360, and the operation of a 3D printer. In the final session, students designed and 3D printed their own custom Lego brick.

Within the duration of 11 sessions of the Summer School of WebOps Club the students were introduced to various topics like Unity, Google VR, MySQL, HTML, CSS, Angular JS, Node JS, Mongo DB and CRUD.



# SUMMER SCHOOL

The Astro & Physics Club held a 4-day summer school in the second week of May, teaching Newton's Laws of gravitation and on to cover topics like the theory of relativity, electromagnetism, radiation, optics, filters and their applications in astronomy.

The iBot Club's summer school in the mid of July had targeted sessions for both beginners and experts in the field, which covered the basics of Linux for ROS, Fusion 360, Robot control systems and much more.

The Computer Vision and Intelligence Group Summer School was the go-to place for all AI enthusiasts, where they covered the basics of Computer Vision, Machine Learning and introduced the concept of Neural Networks, followed by a hands-on session.

The Electronics Club held a 4-day summer school which was aimed at understanding the workings of day to day modules like Bluetooth and IOT. The first three days were hands-on sessions, and the final session of the summer school was focused on integrating the concepts learned in the previous sessions. Students made their own virtual joystick to play a few racing games or FPS games.



# VISTAAR



Vistaar aims to foster the spirit of engineering by coaching budding entrepreneurs and spreading the concept of CFI beyond IITM. To achieve this, CFI offers technical support complemented by the interaction between the students of these colleges and the CFI community at IITM, to help them formulate a plan to set-up their own Innovation Centres. Currently, the initiative is laying the foundations for similar CFIs at IIT Palakkad and IIT Tirupati.

In addition to this, a total of 120 students from IIT Tirupathi stayed on the campus for 2 days to witness the CFI Open House. As a follow-up, 40 interested students from both the institutions were invited to work on club mentored projects in CFI over the summer to experience first hand: the steps, values and spirit needed to establish similar culture in their institutes.

The 3D Printing Club ran a project on building a 3d printer, the Aero Club built a powered ornithopter, the iBot Club devised a rapid pick and place mechanism, CVG created a pedestrian detection system, the Electronics Club project involved fault detection in electric cables and the Auto Club designed an anti-theft lock.

# ALUMNI REUNION 2017

The 1992 batch Silver Jubilee Alumni Reunion occurred on 28th of December, 2017, where the batch pledged to raise \$1.5 million to support the Centre For Innovation (CFI) and Nirmaan, its pre-incubation cell.

The members of the 1992 batch said they decided to raise the grant to foster inventiveness and entrepreneurship among students of IIT-M.

CFI set up several dozen exhibition stalls at the IC&SR Building during the reunion talks, receiving immensely positive feedback for both the scope and the breadth of its projects.

Qualcomm senior director Ajit Rao, of the 1992 batch, said his former classmates and he had observed a blooming entrepreneurial spirit on the campus during a visit five years ago. This spirit, he said, especially notable at the Centre for Innovation, inspired them to support us.

The projects and competition teams of CFI recieved several offers for individual or company sponsorship or mentorship, and investment into Nirmaan by venture capitalists.





## VISITS

With every passing year, CFI has witnessed an increase in the number of people visiting it, be it students, professors, scientists or researchers, media bodies, alumni or other important personalities. Following are the details of some notable visits that took place this academic year:

-Dr. Rahul Purandare, DDRO scientist  
Dr. Senthil Vinayagam, Deputy director of National Academy for Agriculture Research and Management  
Dr. Ahmed Imran from New South Wales, Australia  
Rohinton Mehta, from GoogleX  
Mr. Anupam Vibhuti from New Delhi  
Mr. Sathish, Seshan Rammohan and Nimisha Mehta, alumni.

- Representatives of Larson & Toubro
- Representatives from the University of Texas
- Representatives from JIPMER
- School students from Bengaluru
- MSSW representatives
- Rajiv Gandhi Development Program
- The Open Day had around 250 students from 11th and 12th class visiting CFI.
- E-Cell's E-connect saw students from IIT Bombay, IIT Delhi, IIT Hyderabad and other IITs visiting the centre.

# INVENTORY ADDITIONS 2017-2018

The CFI infrastructure had quite a few infrastructure additions this year to supplement productivity, all the way to advance our technological capabilities to make the workspace more comfortable and user-friendly.

- We had a new smart entrance built, that offers entry only with biometric access
  - We installed 6 CCTV cameras with night vision capabilities
- We obtained a Workstation with powerful computational capabilities for our competition teams to work on
- We obtained a new telescope for the Astronomy and Physics Club
  - We had a PA system added to the inventory
  - We had new projectors and screens added for more engaging sessions
- Societe Generale Bank offered us several thin client CPUs and other required computational accessories
  - We obtained a high resolution DSLR Camera and Tripod for CFI's photography and videography purposes.
- We improved upon our first aid facilities to provide better treatment for those injured
- We purchased several necessary infrastructure items like high power pedestal fans, tables, chairs, high power LED lights etc.



# ENVISAGE

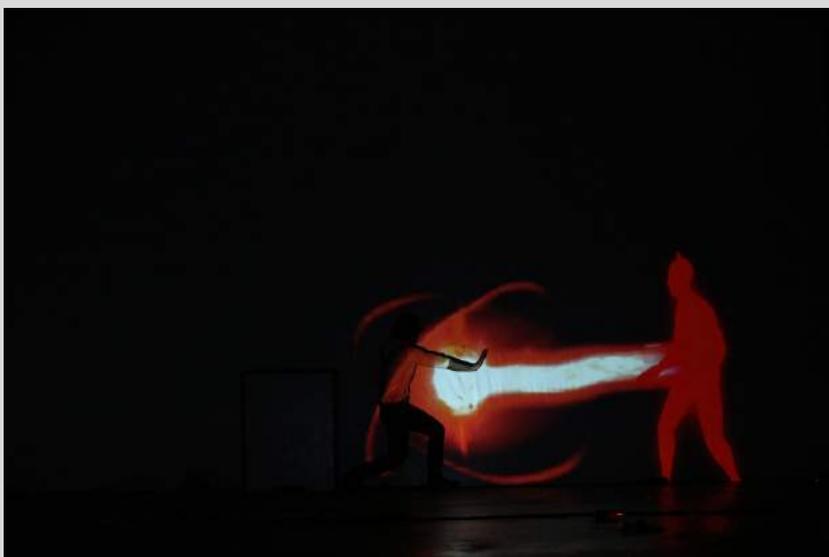
Team Envisage works on techno-entertainment projects and presents them as a show and as an exhibition. Six years since its inception, the Envisage show remains India's first and only student orchestrated techno-entertainment show in the country.



Established as a club towards the end of 2016, team Envisage successfully completed its first year as a CFI club. The past year has been significantly adventurous. A lot of new avenues have been explored. The team has worked on twelve projects in the past one year.

The year started off with the Virtual Instruments project winning the team the Most Innovative Project award, in the Apollo Innovation Week held by Apollo tyres, as part of their centenary celebrations. Envisage had one of its older projects

Envisage had one of its older projects Neon Dance performed by first years, during the freshie night in the fall of 2017, illustrating a fusion of technology and entertainment, in an otherwise purely cultural event.



# ENVISAGE

Four of the team's projects were exhibited in the Shaastra theme launch that happened towards the end of September. A prototype of the Laser Show project was used for the countdown of the theme launch.

The team displayed six of its projects during the CFI open house on 8th October, 2017. Some of the projects were also presented for the alumni reunion event which happened in December, last year. The team also presented four of its projects at PVR Grand mall as a publicity event on the new year's eve.

Envisage saw its biggest show yet in January, during Shaastra 2018. The team worked on a total of 10 projects for two shows which were organized back to back to accommodate the 5000+ audience from all over the country and a four day exhibition of the Tech Ambience projects, presented for the fifty thousand people who attended the fest, to interact with.

Moreover, two of the projects were presented at the Engineers' Conclave during the Inter IIT Tech Meet 2018, which happened at IIT Madras this year, and secured points for the institute.

The team has gotten a provisional patent for its project, the 3D Graphic printed Waterfall and has applied for a patent for Virtual Instruments, in the past year.

The Envisage team regularly receives requests to perform in technical fests of various colleges as professional artists. There was a mini Envisage performance at Kurukshetra, the tech fest of Anna University, in February this year.

# INTER-IIT TECH MEET 2018

The 6th Annual Inter-IIT Tech Meet was held at IIT Madras this year on the 6th and 7th of January. The first officially recognised Inter-IIT Tech Meet saw participation from 16 IITs. The main motto of this meet was to foster innovation, generate impact and encourage collaborations between IITs.



The meet was won by IIT Kharagpur, followed by the first runners up IIT Roorkee, while IIT Madras finished third. Teams from IIT Madras were placed second in problem statements such as Optimal Bidding, Automated Toilet Cleaning Bot, Safety Device for Fishing Vessels and Engineer's Conclave.

# INTER-IIT TECH MEET 2018

Several fascinating Problem Statements formed the core of the Tech Meet, which are outlined below:

**Warehouse Inventory Check:** The primary objective is to develop a UAV which can fly indoors (with any onboard or off-board computation and tracking system).

**Automated Toilet Cleaning System:** Build and demonstrate a fully automated mobile robot that can clean a toilet. The robot should be compact, user-friendly, cost-effective and should consume minimum resources.

**Optimal Bidding:** Considering a scenario of a gated community, who wants to participate in the electricity bidding using 'Day Ahead Market' (DAM), formulate and develop an algorithm to solve the optimization problem with an objective to minimize the daily electricity bill of the community as a whole.

**Safety device for fishing vessels:** The objective is to develop a device that can forewarn host fishing vessels the presence of larger vessels in the vicinity,

**Orbital Simulator:** Teams have to code and come up with a simulator that would help deal with the possibility of an agent X to impact human societies on Mars.



# INTER-IIT TECH MEET 2018



Exoplanet Detection: An ML-based event where teams must come up with an algorithm to classify Kepler Objects of Interest (KOIs) as having exoplanets/not having exoplanet using light curve data from NASA's Kepler probe.

Fiducial localisation in Medical Imaging: For any given DICOM (MRI/CT scan) series data of the patient with fiducials affixed, it is required to obtain autonomously the number of fiducials and coordinates of the centre points of the fiducials with respect to any coordinate reference.

Technologies for Soldier support-  
For a soldier's improved combat effectiveness, other elements such as sights and other aiming systems, night vision devices, NBC protection body armour, weapons, clothing, lightweight & flexible power packs are also to be improved.

At the end of the meet, an Inter-IIT Tech Meet Constitution and a Pre-Meet Pan-IIT technical secretary meeting were pledged. All the solutions to the problems were compiled in a Tech Meet Big Book. IIT Bombay was chosen to conduct the next Tech Meet. Overall, the Meet gave a new outlook to the Inter-IIT tech culture and we hope that this will grow in the years to come.

# PRESS CONFERENCE 2018

On 13th April 2018, a Press Conference was held to create awareness among the media about the Centre for Innovation, and its major competition teams: Team Raftar, Team Anveshak, and Team Abhiyaan.



Addressing the Press Conference, Prof Bhaskar Ramamurthi, Director, IIT Madras, said, “CFI has emerged as the model in the country for fostering hands-on innovation among students. IIT Madras students are found there in the hundreds throughout the year, developing prototypes for international contests, and precursors for products that can be spun off through startups. The academic year 2017-18 too has been, like past years, very productive for CFI.”

Speaking about CFI, Prof Sivakumar M. Srinivasan, Dean (Students), IIT Madras, said, “CFI has been a unique place at IIT Madras that has provided for nuts and bolts of imagination, experiential learning, creativity and planning. It has inspired many students into becoming innovators and inventors. There is tremendous enthusiasm among the teams participating in various competitions. This, I am sure, has helped build muscles of confidence in them.”



# CFI COLLABORATION WITH JIPMER



CFI joined hands with the Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), to help come up with technological solutions for various life threatening situations in the medical sector. A group of 18 students from CFI and 3 Professors went on a one day tour to JIPMER and interacted with a team of senior doctors.

Several Projects are being worked upon now by the CFI Team, including Trolley Localization and Navigation, Smart Crowd Management in Hospitals, AI for Head Trauma CT scans, Autonomous TB Detection, Prediction of Mortality, Light Cycling in ICU, and Oxygen Cylinder Level Indicator.



# TECHSOC 2017-18

TechSoc is the annual inter hostel rolling championship consisting of a series of competitions held around the academic year based on technology. The tough competition between the hostels as they fight for tech glory only goes to show the institute's technological acumen and enthusiasm to innovate.

The TechSoc championship this year began with the Reverse Coding event. Consisting of puzzles, algorithm challenges and a coding event. This was followed by a collaboration with an external data analytics company. The industry defined problem was posed to the hostels to solve in the most ingenious way.

Techsocs's flagship event, Manual Robotics, was held on 5th November 2017. The theme of Luggage Logistics was innovatively explored by the hostel teams. Jamuna Hostel clinched the first place for being the most creative and efficient, while Tapti and Cauvery Hostels came second and third respectively.

The Online programming contest was held in the even semester consisting of problems defined by the programming club to put the aspiring coders through their paces. Godavari Hostel placed first, followed by Narmada and Ganga Hostels



# NIRMAAN



Nirmaan is a program structured for students whose ideas have the potential to be transformed into a start-up. The program offers mentorship from faculty and alumni as well as providing funding to incubate these start-ups. Students can take their first step into entrepreneurship and experiment in the shield of a risk-free environment, guidance, and resources.

The launch of the program this year garnered considerable interest from the student community, with over 12 teams signing up.

They have had two successful induction sessions, two review sessions to handle funding requests, and mentorship sessions where they connected a set of teams to a personalized mentor depending on their idea.

The Nirmaan Teams during the year 2017-18 were: WASS, Avriti, Filmloop, Tan 90, Self Hand, Engine Sim, PostInc, Decanter, Quantin, Modular UAV, Dynamove, SDG Society, Melvano, Involve, Digital Flora, Lovtics, i-Sens, Electric Bevel Gear Bicycle, Infillion, Modulus Housing, Smart Secure, Rang, Theeta, and Ippi.

# TEAM RAFTAR

Team Raftar competed in the 2017 edition of Formula Bharat which had a total of 70 participating teams taking the track in

Coimbatore. The team performed well in the static events qualifying for the design finals, while bagging third in the business plan. Having qualified the mandatory tests the team participated in the dynamic events securing 1st in skid pad, fuel efficiency and the marquee 22km fuel efficiency endurance run. Based on these events Raftar scored 738 points to finish the competition at 2nd place in the overall standings out of 55 teams, 9 points behind the first team.

Team Raftar competed against 51 leading European and international combustion teams at Formula SAE Italy 2017 organized at Riccardo Palletti circuit from the 19th to the 23rd of July. Raftar achieved the distinction of being the first ever Formula Student combustion team from India to complete an Endurance event in an international competition. The team placed 15th overall and placed first in the Fuel Efficiency category.

Team Raftar was placed Third Overall among 71 teams from all over India at Formula Bharat 2018. The team's latest challenger, RFR 18 was also the lightest aero packaged car in the competition with a weight of just 178 Kgs. It is also the only Indian team to successfully register for Formula Student Germany, which will be held in August 2018 at Hockenheim.

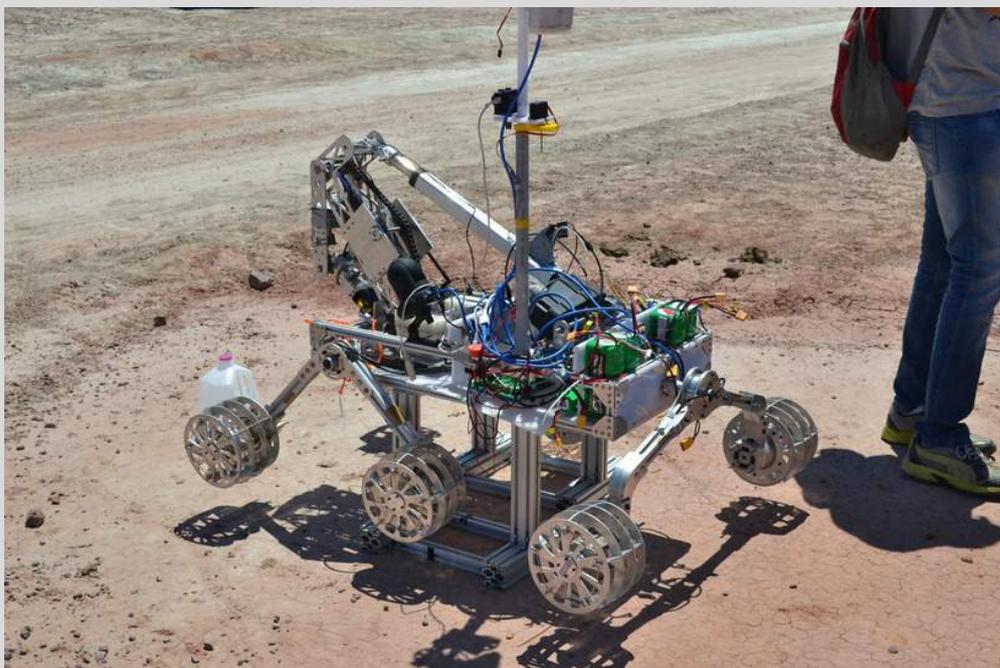


# TEAM ANVESHAK

Team Anveshak is a young team of about 30 dedicated students driven by the common objective to represent our institute at the annual University Rover Challenge. As a part of the challenge, the rover is expected to perform several tasks which include traversing over an uneven terrain autonomously, performing soil analysis and servicing equipment, in an environment similar to that of Mars.



The team cleared the preliminary round (Critical Design Report) at their very first attempt and went on to be placed 29th out of 36 teams after a close run points-wise at the main event held in Utah, USA. Having already won a sponsorship of \$1000 from Protocase Inc, the team are looking to increase sponsorship and to give a real push for URC 2018, for which they have already qualified.



# TEAM ABHIYAAN

Three years after its inception, Team Abhiyaan ventured into its first Intelligent Ground Vehicle Competition (IGVC) held at Oakland University, USA, this June. IGVC is an annual international robotics competition that requires the teams to build an autonomous unmanned vehicle capable of negotiating an outdoor obstacle course under a prescribed amount of time. The team used AI algorithms to implement optimal path planning and control, and designed a robust algorithm for lane detection.

One of the two teams to qualify from India, Team Abhiyaan finished the Design challenge and the Qualifying Challenge to be eligible to partake in the AutoNav (Autonomous Navigation) challenge. They were the 13th team to qualify. They have also qualified for the zonal round of the DRDO Robotics and Unmanned System Exposition.





## TEAM

### AVISHKAR HYPERLOOP

Team Avishkar Hyperloop, formed in September 2017, participated in the SpaceX Hyperloop Pod Competition 2018 and was one of the 47 teams out of nearly 1500 across the globe, and one of two teams from India, to have successfully cleared the Preliminary Design round and qualified for the Final Design round.

### TEAM ADHIRA

Team Adhira was placed Fifth Overall among nineteen teams from all over India in the first season of the Formula Bharat Electrical Vehicle Design Challenge, organized at Kari Motor Speedway, Coimbatore.

### TEAM AMOGH

Team Amogh created an unmanned underwater autonomous submarine, and were shortlisted for the DRDO Robotics and Unmanned System Exposition.



# CARBON ZERO CHALLENGE

The Carbon Zero Challenge, presented jointly by the US Consulate, IIT Madras and Virtusa Polaris, is a contest that seeks carbon neutral and grid-free alternative systems in the energy plagued sectors of Urban Housing, Transportation Systems, Industries, Water and Waste Management Systems and Agriculture which are economically viable, socially acceptable, environmentally friendly and easily replicable.

A team of 5 CFI students from IIT Madras were selected as one among the top five in the Urban Development Challenge. The main aim of their project was to reduce the energy consumed by streetlights, for which they developed an intelligent street lighting system. Known as iLighting systems, this project from the Electronics Club emerged as the Technical Excellence Award winners for the Carbon Zero Challenge!



# ACHIEVEMENTS

ICPC 2018: ACM International Collegiate Programming Contest is an annual multi-tiered programming competition among the universities of world. In the Gwalior region, team Supercalifragilistic from CFI secured the 2nd position amongst 98 teams. This guarantees a spot for IIT-M at the World Finals to be held in Beijing.



Winner, Hack2Innovate: Team from CVI, CFI won the Chennai edition by presenting a Deep Learning approach to hand gesture recognition. Hack2innovate is a Computer vision and Deep Learning hackathon presented by NVIDIA, Samsung and Microsoft, in association with NITI Aayog held across seven cities in India.

Team Firmator and InDhan were shortlisted for India Innovation Challenge Design Contest (IICDC) 2017 by Texas Instruments India, NSRCEL IIM Bangalore, and the Department of Science & Technology

The Lockheed Martin C-130 Team was awarded the Best Student Innovator of The Year by the Auto Tech Review panel at the Indian Automotive Technology and Innovation Awards 2017.



# ACHIEVEMENTS

The Foldable Houses team participated in a Business Model competition conducted by VENTURA-NIT Trichy and were declared the national winner, winning a cash prize of Rs.75,000 , FS6 alpha card (worth one million USD), legal representation from YSS legal, services worth 40\$ from digital ocean, free platform developer package from Balsamiq, free backend services from Hasura and video promotion from Justvideos. The team was adjudged the National Winner for their CFI project entitled 'Foldable Houses' in the 2nd National Social Enterprise Idea Challenge conducted by Azim Premji University, Bangalore. The team also won the Tech and Innovation Fair challenge in Shaastra 2018.

Design Impact Awards by Titan and Tata Innovation Cell: Foldable houses, Electrolarynx and the Automatic Waste Segregation project were shortlisted for the quarter finals.

The Electrolarynx was shortlisted for the finals of Dr. Pradeep P Thevannoor Innovation Awards 2017

Involve is in the top 16 teams to be selected across 47 teams and 97 delegates globally for the Young Social Entrepreneurs Fellowship Program by the Singapore International Foundation,



# ACHIEVEMENTS

A five-member delegation from CFI represented IIT Madras at the INAE Youth Conclave organized by the Indian National Academy of Engineering.



Several teams from CFI qualified for the second round of the Smart India Hackathon 2018 Hardware Category: Advance Electrolarynx, Automatic Waste Segregator, Safety Systems for Small Vessels, Modular Plane, and the Artemis Railbot.

A team from the CVI group qualified in the Software Category

At the recently concluded DEFEXPO 2018, CFI members bagged the 5th and 6th places, where they proposed their solutions to the honorable Defence Minister Nirmala Sitaraman to implement and solve defence problems.



The Hybrid Bevel Bikes team won the National Clean Air Crowdsourcing Competition organised by CCAPC, IIT Delhi and the University of California Berkley.

Inter IIT Tech Meet 2017: Teams from CFI bagged the 2nd place in the Dashboard event, and the 3rd and 4th place in the Unmanned Aerial Vehicle Design Challenge.

# FELICITATION CEREMONY



CFI felicitation ceremony began with a speech by Raghav S Vaidyanathan, the new Student Executive Head for 2018-19. This ceremony officially marks the beginning of his tenure.

It was attended by all the enthusiastic junta of the institute, where a lot of them were awarded with prizes and certificates for their participation in various tech related events conducted through out the year, including the first ever inter-IIT tech meet.



Tapti won the tech-soc this year followed by Godavari and Ganga in second and third places respectively.

## List of Projects

CLUB	PROJECT	BRIEF DESCRIPTION
<b>3DP</b>	<b>3D printed house</b>	The project involves development of a 3D printer which can print in concrete and build affordable houses which can be printed within 24 hours for refugees or homeless people or people affected by natural calamity in a very short time with minimal cost.
	<b>Delta 3d printer</b>	It is an indigenously built, triangular bed 3d printer from scratch.
	<b>3d printed myo hand</b>	This project consists of a 3d printed hand which simulates the motion of hands of the operator using a myo band
	<b>3D printed Animal Prosthetics</b>	This projects involves collaborating with animal NGOs and veterinarians to help these animals with 3D printed customized prosthetics.
	<b>3D printed Plaster Cast</b>	Model made up of ABS material which is waterproof, lightweight, cheap and easy for doctors to examine. Unlike conventional plaster this doesn't take much time to fix on patient's hand. A cool modern design which lets your skin breathe , doesn't disintegrate in water and allows you to get back to your regular life.
<b>Aero</b>	<b>Modular Plane</b>	This project aims to develop a customizable plane in parts that can be fit together to obtain desired results. All the parts of the plane are linked together by using magnets and some structural support. This design safely dissipates the kinetic energy under an impact by splitting in modules and the plane remains crash tolerant.
	<b>Flight Control board</b>	Micro Aerial Vehicles are inherently unstable and they require active flight stabilization for flight. Commercial Controllers have rigid framework and newer drones require complicated control laws. This project aims to develop a customizable Flight Controller at CFI for Quadcopter, Ball drone, Tilt rotor and helicopters using a quaternion based approach for stabilization. Quadcopter is currently stabilized successfully with our controller, with plans to incorporate guidance and build a fully fledged autopilot.
	<b>Ball drone</b>	The Ball Drone is a special kind of vertical take-off UAV. The spherical (ball) shape of the drone makes it stand unique from the other multi-rotor drones due to its ability to bear a good amount of shock (crash-proof). The rotors are protected in it's spherical cage structure making it harmless and safe under operation. The Ball Drone consists of a single propeller and 4 flaps with individual servos to control each flap. The spherical structure is made using coroplast sheets. Balsa pieces have been used to increase its mechanical strength. The electronic components include a motor, an ESC, a transmitter-receiver set, 4 servos, a KK board (flight control board) and a lipo battery.
	<b>Tilt Rotor</b>	Featuring VTOL and efficient cruise, Tilt rotors are one of the most versatile aerial vehicles. This project aims to develop a small scale tilt rotor UAV at CFI. A tandem wing prototype was built to validate the cruise flight, and basic VTOL to cruise maneuver was simulated. The VTOL to cruise maneuver shall soon be implemented on the prototype.

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Analytics	<b>Stock Market Analysis</b>	We have developed module and working Sentiment analyzer which scrapes the news and check for the Sentiment of the news to check for positive and negative effects on the particular stock. We are also using Google Trends data to see the impact of the news and so that we can predict the price accurately.
	<b>Health Care Analytics</b>	The team aims to solve the problems in healthcare field with the use of machine learning. Currently we are using the data available in kaggle to analyze the mental health condition of employees working in technical workplace. The current dataset we are using contains the details of 25 parameters that influence the mental health condition of employees which includes the number of employees in the firm and the attitude of managers and co-employees towards mental health issues. The scope of the project can be widened by using these techniques to predict the health condition of individuals.
	<b>Credit Card Default</b>	In this project we analyse the data to predict whether a person defaults loan or not. The main challenge here is class imbalance and dimensionality reduction. We have studied various class imbalance and dimensionality reduction methods to analyse the data set.
	<b>Human Resources Analytics</b>	This project aims to ascertain the attrition of experienced employees in workforce of a firm and to devise human resources strategies to avert the cases of attrition using numerous metrics. We developed analytic models to accurately predict the attrition rate and achieved a maximum accuracy of 99%. Our future agenda is to develop models to devise HR strategies which could avert attrition.
	<b>House Prices: Advanced Regression Techniques</b>	Housing prices are talked about in several contexts and are closely followed by people from all strata of society. However, they are also known for their volatility and unpredictability. This project aims to predict the same by analysing characteristics of a house such as location, age, size, etc. For this purpose, well-known regression techniques such as XGBoost, GBM, etc. are utilised.
Astro & Physics	<b>Rocket Mission Simulator</b>	The project tries to make a simulator that would recreate some of the most phenomenal maneuvers in spaceflight history. The end goal of this project is to be able to develop a commercially viable software that can be used for simulating future missions by space agencies. The team has successfully completed the project (orbital maneuvers and launch window analysis) and are now aiming to build a single staged rocket.
	<b>Handheld Spectrometer</b>	The project aims to interface the mobile to a handheld spectrometer so that spectrometry data can be accessed anywhere and anytime. The device is basically an arduino microcontroller, a micro spectrometer and a BT module connected to an appropriately designed PCB, and can be powered by using a power bank. The test subject is flashed with a blue laser (which is the closest substitute of a UV laser) and the emitted spectrum is analysed.
	<b>Exoplanet Detection</b>	the project aims to develop an ml algorithm to identify exoplanets outside the solar system. Data from NASAs Kepler telescope is used to identify potential exoplanet star systems.

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	<b>Radio Telescope</b>	An amateur radio telescope has been designed and built using the components of a satellite TV dish antenna. The parabolic dish works as a reflector and the Low Noise Block works as a receiver of the radio waves. The output of the receiver is recorded using a satellite finder meter. This radio telescope works in the frequency range of 10 GHz – 12 GHz.
<b>Competition Team</b>	<b>Raftar Formula Racecar</b>	A small group of highly determined students founded a team to compete in prestigious international Formula Student competition series. Dedicating an entire year towards developing a single seater open-wheeled race car worthy of representing IIT Madras and the country in a field comprising of the best talent from around the globe, Raftar Formula Racing made their hugely successful debut run at the Silverstone Circuit, Formula Student United Kingdom, 2012. Today, Raftar Formula Racing has evolved into one of the most respected and recognized Formula student racing teams in the country, heading towards a strong fourth season equipped with 5 years of competition experience.
	<b>Anveshak Mars Rover</b>	Team Anveshak is a young team of about 30 dedicated students are driven by the common objective to represent our institute at annual University Rover Challenge. As a part of the challenge, the rover is expected to perform several tasks which include traversing over an uneven terrain autonomously, performing soil analysis and servicing equipment, in an environment similar to that of Mars. The team cleared the preliminary round ( Critical Design Report ) at their very first attempt and went on to be placed 29th out of 36 teams after a close run points wise at the main event held in Utah, USA, winning a sponsorship of \$1000 from Protocase Inc.
	<b>Abhiyaan Intelligent Ground Vehicle</b>	Abhiyaan is student team of 32 enthusiastic members who share a common dream of building intelligent navigation systems. Team Abhiyaan represented IIT Madras at the Intelligent Ground Vehicle Competition (IGVC), an annual international robotics competition that requires the teams to build an Autonomous unmanned Ground Vehicle (AGV) capable of negotiating an outdoor obstacle course under a prescribed amount of time. The competition is held every year in Oakland University, Michigan, USA. The team used AI algorithms to implement optimal path planning and control, and designed a robust computer vision algorithm for lane detection. Being one of the only two teams from India and one among the 14 global teams out of 31, Team Abhiyaan finished the Design challenge and the qualification round to be eligible to partake in the main course of AutoNav (Autonomous Navigation) challenge. Despite difficulties due to a limited budget, international travel, unknown terrain and soil conditions, the team's performance was encouraging.

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<b>Competition teams</b>	<b>Amogh Autonomous Underwater Vehicle</b>	<p>Team Amogh is a group of highly motivated individuals focused on developing an Autonomous Underwater Vehicle (AUV) for participating in the annual AUVSI Robosub competition. A diverse problem set simulating adverse underwater conditions and intense competition from around the world pose great challenges to the team every year. Equipped with state of the art image processing algorithms and an extremely robust mechanical design, Amogh leverages cutting edge technology to tackle every problem. A lightweight design at the fraction of the cost of other, including commercially available models makes Amogh stand out from the rest of the competition.</p>
	<b>Avishkar Hyperloop</b>	<p>Avishkar Hyperloop, a team of highly enthusiastic engineering students ranging from undergrads to Phd scholars of IIT Madras, is spearheading the college's as well as country's attempt at SpaceX Hyperloop Pod Competition 2018 competition. We work together in IIT Madras's student lab - Centre for Innovation ( CFI ) - with the common goal of making the best Hyperloop pod ever and helping humanity move one step closer to achieving an incredible new mode of transport Our preliminary design for SpaceX Hyperloop Pod Competition 2018 has been accepted in our very first attempt and we have successfully cleared the first stage of the competition! With more than 1000 teams participating globally, we are one of the 47 teams to have been shortlisted for the final design submission. We hope to keep moving forward and achieve success in contributing to this new mode of transport !</p>
	<b>Adhira Formula Electric Car</b>	<p>Team Adhira, is a young and enthusiastic team of 18 budding engineers, working meticulously, towards the monumental task of designing our first ever Electric Vehicle of IIT Madras. The engineering design goal for teams is to develop and construct a single-seat race car with the best overall package of design, construction, performance and cost. Not only does it test a team's engineering capabilities, but also assesses how it would market the car through a business plan presentation to the judges.</p>
	<b>Cargo Ground Build-up System, Lockheed Martin Payload Challenge</b>	<p>As part of the Lockheed Martin's Indian University C-130 RO/RO Payload Design Program, the IIT Madras research team identified a need for a method to enable handling of cargo delivered by the C-130 aircraft at austere locations that do not have any other infrastructure to rapidly offload and remove cargo from limited ramp space. The IITM CGBS concept proved worthy of further development by the university team and the team has been awarded a university research grant by Lockheed Martin to refine their conceptual design into an engineering concept demonstration unit. Lockheed Martin is monitoring the progress of this project to see if it is eligible for an offset project.</p>

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CVI	<b>Cell Segmentation</b>	Automated identification of cell boundaries from pathological slides holds tremendous potential for cancer diagnosis. Most image analysis tools for this use high resolution images which are difficult to take and high RAM for analysis. In this project, we have tried to develop a solution for capturing a regular video of the slide, decomposing the video to frames and identifying cell boundaries. We have used regular image processing methods such as contour detection, adaptive thresholding, watershed algorithm and structured forest algorithm for determining the cell boundaries.
	<b>Sub pixel Super resolution</b>	This project was aimed at implementing a CSI (TV Serial) style Resolution enhancer for images. A Deep Learning Super Resolution approach was adopted, and traditional transposed convolutions, generally used for upsampling in Deep Learning, was ditched for an Efficient Subsampling Method based on the Phase Shift approach.
	<b>Satellite imagery feature extraction</b>	Understanding satellite imagery at scale has become crucial to perform mapping of vast areas to the minutest detail. In this project we are attempting to build complete mappings of cities. To start with, we have worked extensively on the DSTL kaggle competition on Satellite Imagery Feature Detection. Over the initial phase, we have built an in-depth understanding of the various preprocessing techniques required to make the data trainable on. We have trained using modifications of the base U-net model that performs quite well on segmentation tasks. We have started working with city datasets (data.cityofnewyork.us and opendata.dc.gov/datasets/roads-all) that are very context specific, where the classes are roads, gardens, buildings, parking lots etc.
	<b>Face Liveliness detection</b>	Face recognition systems are widely used at a commercial scale for security accesses. Though the systems have grown quite good at the recognition task, they are quite prone to intentional hacks. We attempt to build a face Liveliness system that distinguishes between a real face and a copy of a face.
Electronics	<b>EM Sense</b>	Most everyday electrical and electromechanical objects emit small amounts of electromagnetic (EM) noise during regular operation. When a user makes physical contact with such an object, this EM signal propagates through the user, owing to the conductivity of the human body. We can detect and classify these signals in real-time, enabling robust on-touch object detection. The brief idea is to use a low cost commodity hardware, small enough to be worn on the wrist, which in the future may also be easily integrated into smart watches. The principle used in this project is sensing, made possible through detection of objects with the user.
	<b>Intelligent Lighting</b>	The project aims to conserve cost of street lighting system by enabling communication between streetlights and optimizing the usage of lights thereby conserving power

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Electronics	<b>Smart Vision for Indian Army</b>	A typical Night Vision Device costs around Rs. 80,000, which in turn becomes a problem for the 14 lakh soldiers in the Indian army. Hence a small device has to be fabricated which would help the soldiers to locate their own teammates at the same time live stream information regarding the position of the individual soldier under night operation back to the command unit. The project hopes to achieve a small wearable device with great accuracy, making use of the IOT technology and turn it into a manufacturable product which could suffice the shortage of Night Vision Devices in the Indian army.
	<b>Airborne Wind Turbine</b>	The aim of the project is to create an airborne wind turbine to enable electricity generation in hilly terrain. There are several problems that hinder complete utilization of wind energy, namely – cost, transportation and installation of the huge tower and blades, and difficulty in building taller towers and terrain. Tower cost alone accounts for 22% of the total turbine cost. The basic idea is to raise the rotors to greater heights. The turbine will be tethered to the ground with wires and cables so that it does not drift, leading to lower cost per turbine, Easily re-deployable based on seasonal changes in wind, transportation and installation will be easier and less expensive compared to traditional wind turbines
	<b>Interactive Gym</b>	Creating a smart, interactive gym that gives a user an immersive and personalized experience in the gym. It would also entail training programs by trainers to create a USP.
iBot	<b>Railroad Crack Detection Bot</b>	Detecting fractures in the railway tracks without any need of human intervention. The design allows trains to simultaneously run on the tracks. It aims at reducing the number of accidents caused by manually checking for any fractures or gaps in tracks as it is not only unfeasible in case of longer track lengths but also risky as rail traffic can seldom be stopped in times of such inspections.
	<b>Inventory Manager</b>	This is a first of a kind inventory management device. Inventory management is a practice overseeing and controlling of the ordering, storage and use of components that a company uses in the production of the items it sells. This is a first of a kind inventory management devices. The working principle is torque causing rotational motion.
	<b>Tron Bike- Self Balancing Bot</b>	A one wheeled self balancing robot implementing RL algorithms for maintaining positions.
	<b>Miniature Sewage Treatment plant- Decanter</b>	A scaled down, household waste water treatment system, using treated sewage waste water to flush toilets, saving about 40L of water per household per day.
	<b>Automatic Stirrer</b>	An automatically rotating, timed stirrer, that features Portable design, Adjustable supports to be compatible with vessels of different radii, Adjustable stirrer angle to cover all corners of the vessel, Height adjustable stirrers for vessels of different depth, Detachable stirrers for easy cleaning, and Customizable stirrers for different cooking purposes.

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PM	<b>Foldable houses</b>	Foldable Houses is a fully furnished prefabricated structure, whose basic principle is similar to that of a telescope which makes it possible for a house to be folded into a small box. These structures are compact, portable and easy to setup. It is lightweight and easy to transport, reducing redeployment cost. The house is very cost effective compared to the conventional temporary structures, strong, sturdy and durable with at least 12-15 years of expected lifetime. Foldable Houses is a highly versatile design which can be customized to various use cases. These structures when utilized at its fullest potential, can cater to different market segments like Disaster management, refugee housing, temporary shelters and temporary infrastructure in construction industry.
	<b>Involve</b>	At Involve, we organize after-school classes for students who require academic improvement at low-income private schools. This is made possible through our unique peer teaching model where we train and mentor senior school students (Educators - from 8th-11th standard) to teach their juniors (Learners). We have a school transformation manager (STM) who looks after the progress of the students, discipline and full logistics. After making an impact to more than 100 students through our two pilot projects, we are fully operational now and working with 1 school in Chennai, along with the expansion plan to 3 more schools next year. We were awarded as the winner of Global Engagement Summit held at Northwestern University, Chicago. We were also the regional winners of Sandbox Samvidha by Deshpande Foundation and Startup Jalsa by The Ideaz Factory.
	<b>Bevel Gear</b>	The project aims to replace existing chain and sprocket bicycle mechanism with an efficient and robust bevel gear transmitting system along with electric power assistance. We are making an aesthetically well-defined frame starting from sketch to a robust and long life frame. We will build an in-house sensor and control system for the most effective electrical assistance which assures safe riding of the bicycle at the same time maintaining health and helping to commute faster. The vision of our project is to come up with a smart bicycle model whose sole purpose is to reduce human effort and reduce our carbon footprint by commuting with an electric power bike.
Sahaay	<b>Aquatic weed removal</b>	To design a mechanism which can be used to remove aquatic weed from water bodies and help in restoration of aquatic life.
	<b>Rehabilitation Workbench</b>	To design a workbench which could be used for the rehabilitation of upper limbs of children suffering from Cerebral Palsy and Stroke Patients
	<b>Automatic Waste segregation</b>	To design an intelligent dustbin which would segregate waste into different categories with the help of a camera and other sensors, using deep learning.

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<p style="text-align: center;"><b>Sahaay</b></p>	<p style="text-align: center;"><b>Toilet Sanitation</b></p>	<p>The project aims at designing a simple, easy to use, produce and maintain attachment for the already existing toilets that will aid in the cleaning of the seat in an autonomous fashion. The installation will be user friendly and the cleaner will be a commercially available one, thus making its functioning and maintenance easy. The need for such a sanitation mechanism was brought out by Mr. Kumar, working in a financial firm, and seeing it as a socially valid need, the team decided to make it a reality. The team meets with Mr. Kumar on a monthly basis, keeping him abreast of the developments.</p>
<p><b>TE</b></p>	<p style="text-align: center;"><b>Virtual instruments</b></p>	<p>Virtual instruments are musical instruments without any physical structure, but resemble the actual instrument in their function. We present it as a concert of 5 to 6 instruments like flute, violin, guitar, etc.</p>
	<p style="text-align: center;"><b>Hand Gesture recognition for swarm bots</b></p>	<p>With the ever growing popularity of usage of drones for consumers and businesses, the inevitable necessity of fleets/swarms of drones being deployed, is in the very near future. Swarm technology is an approach to coordination of bots within a multi bot system. It was inspired by studying ants and other tiny organisms to know their behavior and apply the same to make multiple robots coordinate to perform a certain task. The team is trying to use image processing (Open CV) for recognising the drones indoors. They are also working on various communication protocols for coordination among the various drones.</p>
	<p style="text-align: center;"><b>Interactive LED Table</b></p>	<p>In comparison to the traditional LED based projects like LED matrix, RGB LED cube, mini POV modules, etc. where people won't get a chance to control what is happening, except watching it as if it were a show, this is a project that it is interactive. The interaction will be based upon proximity detection using infrared LEDs and phototransistors.</p>
	<p style="text-align: center;"><b>Face Sketching Bot</b></p>	<p>The idea of this project is to make a pencil sketcher using two stepper motors which control the two degrees of freedom (X,Y positions). The feed to sketch is to given through processed images.</p>
	<p style="text-align: center;"><b>Dance Dance Revolution</b></p>	<p>DDR is a very popular arcade game developed for many consoles., wherein stepping on an arrow direction corresponding the ones falling in the screen gives one points. This game will be built using a unity+arduino approach. It will have a robust mat with pressure sensors which shall be the user interface for the game. The game is interactive in nature and has prospects of including in malls.</p>
	<p style="text-align: center;"><b>Laser Show</b></p>	<p>This project involves building a fully functional multicoloured laser projector which can take in images and videos as input and project these onto a wall or a screen. It has two parts image processing and hardware. An arduino due is used as a microcontroller which controls the galvos and laser drivers for projecting the images(or frames of a video). For processing the images we use various softwares and python codes.</p>

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CLUB	PROJECT	BRIEF DESCRIPTION
TE	<b>3D Waterfall</b>	The 3D Waterfall is a project of a grand scale, that displays patterns and images in a five metre high cylindrical curtain of water. Grand, not just in terms of physical size, but also the vastness of technical expertise and creative skills involved
	<b>Projection Mapping</b>	Projection mapping is an enchanting visual display that mesmerises the audience by a combination of artistic choreography and interactive projections on stage to create a memorable multimedia performance. Projection mapping, also known as spatial augmented reality, is a technology that uses the surfaces of irregularly shaped objects for projection. By using software (Audacity, After Effects to name a few), a two- or three-dimensional object is spatially mapped on the virtual program which mimics the real environment it is to be projected on. The software works with a projector to fit any desired image onto the surface of that object.
	<b>Kinetic Sculpture</b>	Kinetic art is art from any medium that contains movement perceivable by the viewer and depends on motion for its effect. Our project can be made into a kinetic facade or a ceiling. Stepper motors paired with rack and pinion are used for the movement of each unit of the facade.
	<b>Following Bot</b>	This project is a robot made with the appearance of the R2D2 robot from star wars. It has a programmed Raspberry Pi with a camera module, the feedback from which makes it move its head and body and follow any object in the vicinity, that has the given colour, shape and size.
	<b>Speed Painting Bot</b>	As the name suggests this project is a bot which can paint a large portrait in a very short time in front of a live audience. This is the first time ever that a project like this was tried out. It has an arm with 40 brushes fixed on it, which rotate and align according to the pixel they have to paint next. As the arm moves from the top of the canvas to the bottom, the portrait gets complete with a series of punches on the canvas.
	<b>Multi Coloured PoV</b>	POV is short for Persistence of vision, wherein an arm with a single line of LEDs is rotated at a very high RPM to create an optical illusion of a continuous circular screen. A combination of microcontrollers, ICs and a bunch of other electronic stuff is brought to life into a creating an amazing display medium which would play any existing colored video.
Vistaar	<b>Prusa i3 3d printer+ Robotic arm</b>	A Fused deposition modelling 3d printer and a 3d printed robotic arm
	<b>Powered Ornithopter</b>	An electrically powered RC aircraft that achieves flight by flapping its wings like birds
	<b>electric cable fault distance locator</b>	A smart instrument at base station analyzes faulty distance location and gives notification
	<b>Rapid pick and place mechanism</b>	A mechanism which can be used in industries to pick and place objects at a very rapid rate
	<b>Pedestrian Detection</b>	Real time algorithm which will monitor pedestrian movement in its field of vision
	<b>Anti –theft wheel locking system</b>	If someone tries to move the vehicle when the ignition is switched off, it senses and brakes are applied automatically. Also an alarm is switched on.

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Nirmaan	Digital Flora	Digital Flora provides indoor vertical farming Infrastructure and Solutions for growing food sustainably and cost effectively in urban areas. Our vision is to produce food in urban areas near to the place where it will be consumed in most efficient way possible. We will provide vertical farming infrastructure to anyone who wants to grow food locally. By automating almost all of the aspects required( like climate, growth tracking, optimization using machine learning etc) we believe more people will have interest in growing food by themselves as there will be no agricultural expertise required.
	Theeta	Help the restaurants in improving their inventory, prepared food items and reduce food wastage. Brings customers and restaurants closer. The restaurants in India have a fluctuating demand. During the time when they have very few customers, they'd be willing to give a discount to get some more customers. What we do is get these offers, which are dynamic in nature to the customer. The restaurateur will put up an offer on a day for a short time to attract customers. Our customers can search for nearby restaurants and view the various offers that the restaurants are offering and pick one to eat. Later on we are expanding into consulting services for restaurants. From the data we get in the intial months of our app, we will able to find out 'who eats what at when' and help the restaurants in improving their inventory, prepared food items and reduce food wastage.
	Smart Secure	Aims to enable elderly people to be safe and comfortable in their homes by monitoring and controlling entrance locks of their homes without any need of movement using a wearable wrist gear. The idea includes the use of a customisable wrist gear and a mobile application (which can be used independently) to control the door smart locks (also made by us) . The mobile application is designed for other members of the family who can control the lock from anywhere (within or outside the house). Our product, thus, makes the elderly self dependent for their safety and help them feel more confident in their homes.
	PostInc	Designers exchange ideas on the platform and share their work. This serves as a learning opportunity for them. Later on, we will integrate a freelancing platform in this. Through this, the designers could also serve to the people who are in need of design and get benefited from it.
	Dynamove	Dynamove provides integrated, end-to-end solutions for intelligent transportation systems, making vehicles safe, smart and connected. We are building a hardware platform for in-vehicle alerts and driver assistance, vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication, camera and sensor fusion, predictive maintenance and analytics, and infotainment.

# CORE TEAM 2017-18



# OPEN HOUSE 2017



