



ANNUAL REPORT 2020-2021

THE ROBOTICS SOCIETY STUDENT CHAPTER

Reg. No.: TRS-SC/20/007

BIRLA VISHVAKARMA MAHAVIDYALAYA

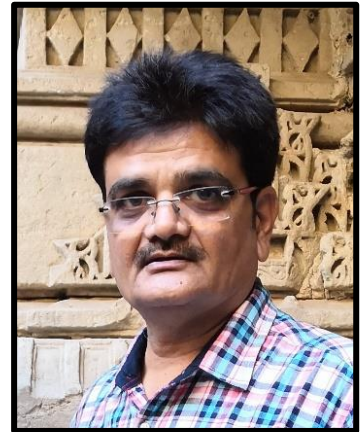
[AN AUTONOMOUS INSTITUTION]

MANAGED BY CHARUTAR VIDYA MANDAL

ENGINEERING COLLEGE, VALLABH VIDYANAGAR: 388 120

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Words from Faculty Advisor

BVM is giving its shelter to another most technically advanced organization, The Robotics Society (TRS). TRS BVM Student's Chapter was all set up in February 2020. We place particular emphasis on practical part because bookish knowledge may guide the way, but practical knowledge experiences the way. We believe that technology will not replace great teachers, but technology is transformational in the hands of great teachers. Members have a set of forums and guidelines, after the provision of the Student's Chapter.

We at TRS BVM believe that any sufficiently advanced technology is equivalent to magic. This magic is reflected by our projects, which are being constructed by the help of faculty and MTech Students. We think we are a team not because we work together but because we respect each other and welcome every member's ideas and projects from their innovative minds. Webinars, Workshops, and Hackathon participation makes us going with the trend.

- Prof. (Dr.) Vinay Patel
Mechanical Department
BVM Engineering College

About TRS BVM Student Chapter

We have a lab with 24*7 accessibility, a place where machines and students tie their knots to make the best futuristic technologies with sufficient computers having graphics cards at our lab and also a facility of supercomputer and 3D printer. Students have access to our library, consisting of the thesis, research paper, technical books, etc. We are thankful to SSIP and TEQIP for providing us with the resources. A demonstrating robot at our lab motivates students to join the Student's Chapter.

After the college hours, it's the real-time working for the students, which is from 6:00 to 8:00 pm. We are heading the regular meetings to share thoughts and techniques, learn more new and innovative things on last Tuesday of every month. Also, if students are free enough and want to spend some time in the lab, then also they are given an in-between excess to the labs.

The working of this organization is as smooth as flowing water just because of the various teams working in different zone's like,

- Documentation team: dealing with the formats of some official letters, make excel records, prepare mails, etc.
- Graphics team: It handles poster making, editing photos and videos of events, making templates of letters, etc.
- Finance and inventory team: maintain financial records, keep records of expenditure, maintain the equipment inventory that is what equipment is available, which are required, which are damaged, etc.
- Developer's team: oversees websites and maintain updates on it regularly.

We all work hands clasped believing that talent wins games, but teamwork and intelligence win championships.

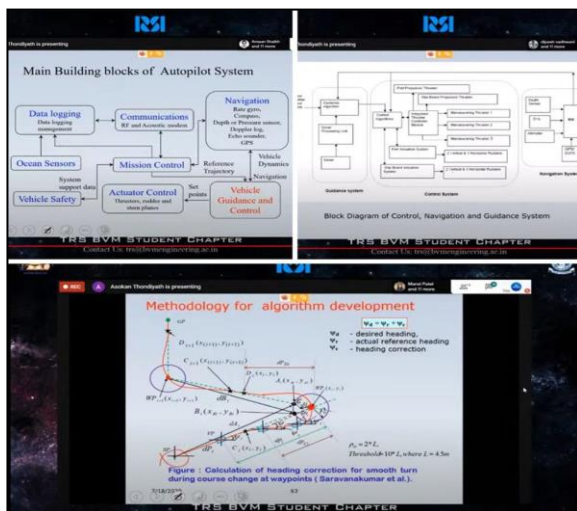
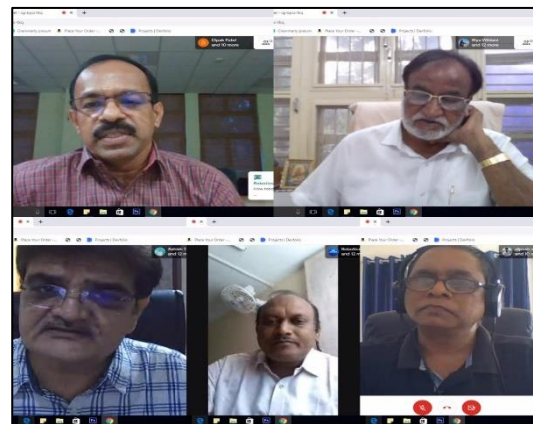
TRS BVM Student chapter team has a great strength of 70+ Student Members and 8 Faculty Members with renowned field expertise.

Activities & Events

We at TRS BVM Student Chapter actively participate in various State level, National level, and International level; Hackathons, Robot Making Competitions, Idea Pitching Competitions. Moreover, we also organize events for fun learning of Student and Faculty members. During the pandemic situation this year, we have organized Online Webinars and Expert Lectures. A glimpse of the participation and events are listed below.

Inauguration Function

The Robotics Society BVM Student's Chapter accomplished its very own inaugural ceremony which was followed by a technical session. The inauguration event was on Google Meet/YouTube where many chief guests and students were invited. The event included its Inauguration, a tour on our Website, and a Technical Session on "Autonomy for Robots - Challenges and Opportunities" by the Chief Guest Dr T Asokan. The Inauguration was scheduled on 18th July, 2020. Event begun with introductory speech of Principal Dr I. N. Patel followed by website demonstration by the chairman of Charutar Vidya Mandal Er. Bhikhubhai B Patel.



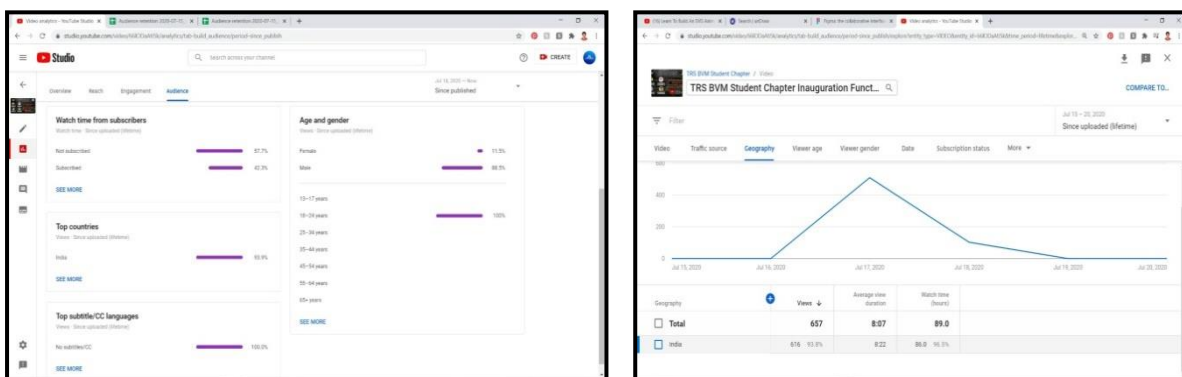
After the inaugural ceremony, chief guest Dr. T Asokan Secretary of TRS India Head & Prof at IIT Madras headed with a Technical session on the topic "Autonomy for Robotics: Challenges and Opportunities". The main objective of the webinar was to make everyone aware of the increasing scope and challenges for the same in the field of Robots. The topics covered in the session are listed below,

- Autonomy for Robotics
- Unmanned Robotic Vehicles
- Autonomous robots
- General control system
- Case study: Autonomous Underwater Robot
- Modelling and simulation
- Design of controllers
- Path planning and Obstacle avoidance
- THE AUTONOMOUS UNDERWATER VEHICLE (AUV)

Speaker enlightened us about the evolution of Robotics Research how with passing time there is advancement in its structure, work, and complexity.

- 1960: Era industrial Robots
- 1970: Robots with mini size handling multi-tasks like mobile, humanoid robots
- 2000: Time when research papers were converted into the application; field service robots applicable for the daily purpose for security, service which increases productivity.

The event took place live on YouTube, so the total number of views gained was around 657. Students and Professors from BVM College and other colleges joined the Event. Talking about the strength of attendees, there were around 616 views obtained all over India i.e., 94% and about 41 views internationally i.e., 6%. The event lasted for about two hours, and in this period, few honourable dignitaries of TRS society were also noticed in the Event.



The ceremony was a grand success and ended fruitfully for everyone who was a part of it. The full video of the inauguration ceremony and the expert talk is available on TRS BVM YouTube Channel. (<https://bit.ly/TRSBVM-Inauguration>).

TinkerCAD Workshop

TinkerCAD workshop for stimulation of Embedded Systems using Arduino was conducted by TRS BVM Student Chapter, with Faculty Expert Prof. (Dr.) D. M. Patel, Electronics Department, BVM Engineering College.



TinkerCAD is a free online collection of software tools that help people all over the world think, create and make. Due to challenges faced during the COVID-19 pandemic offline Arduino workshop has not been possible. Although, an online simulation platform like this can help young robotics enthusiasts get started with Arduino controllers. It provides a virtual environment to design robotic applications and implement them in the physical world.

Students from various disciplines have shown their keen interest in this event, especially for freshmen and sophomores. This workshop aims for students to get started with mechatronic and robotic systems giving them a hands-on experience. Arduino is one of the most popular and open-source, easy-to-learn controllers.

Robofest 1.0 - Level 3

A Team from TRS BVM Student Chapter had Participated in RoboFest 1.0 2019-2020 – A state-level Robot Making Competition, organized by the GUJARAT Council of Science and Technology (GUJCOST, Gandhinagar).

Team BVM had participated in three categories: All Terrain Rover, Four-Legged Quadruped Robot, and Painting Robot; where Rover was selected for the final round of the competition. Rover is a Six wheeled All-Terrain Vehicle which can

inspect places where humans cannot access or reach. The main objective of this project is to develop a mobile vehicle that can go to places where human accessibility is negligible or nil. Such places can be anything like mines, fire hazards, etc where the terrain could be uneven, insufficient network coverage, low lights, unknown environment.

This Rover has successfully qualified Level-1,2 and 3 of RoboFest 2019-20 and has been awarded as the Joint winner in the Rover Category with 1st Rank all-over Gujarat, with total prize money of Rs. 5 Lakhs.

Team Members:

Prof. (Dr.) Vinay Patel (Mentor)

Mr. Jay Prajapati (3rd Year, Mechanical Department)

Mr. Ishwariy Joshi (4th Year, Electronics Department)

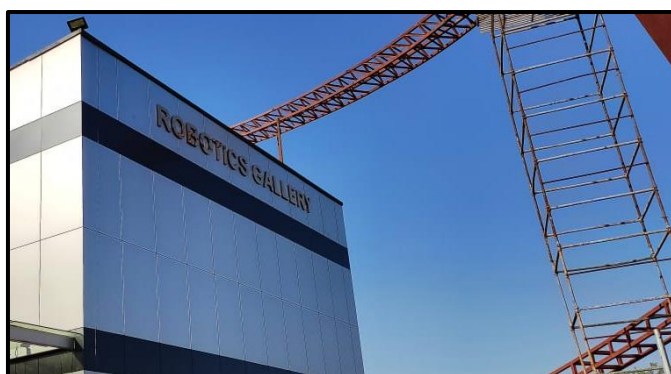
Mr. Dhairya Parikh (Pass-Out, Electronics Department)

Mr. Hussain Badri (Pass-Out, Mechanical Department)

Mr. Harshil Patel (4th Year, Mechanical Department)

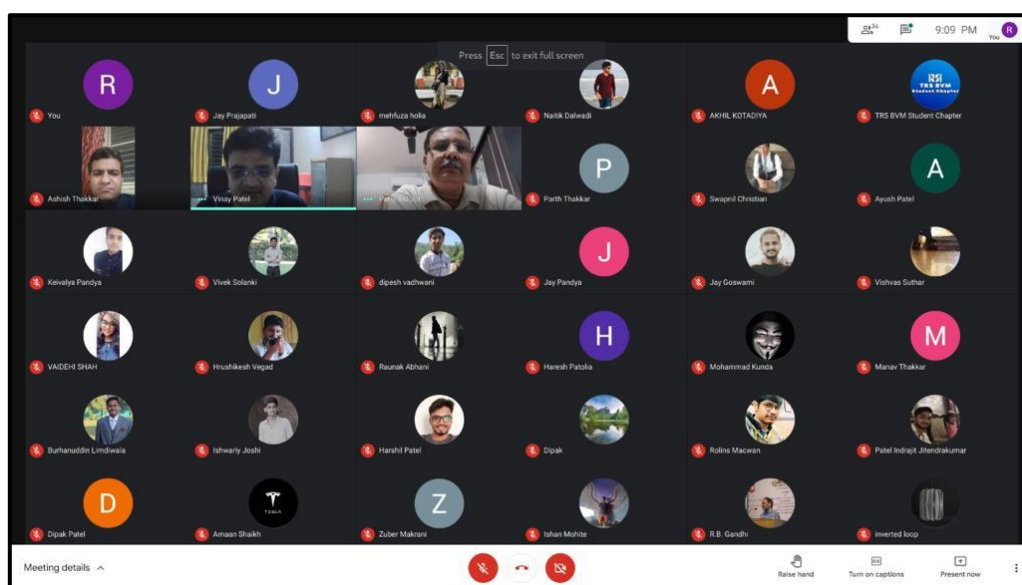


As a reward for the winners, GUJCOST Robofest 1.0 Winner's projects has placed at Robotics Gallery, Science City, Ahmedabad, Gujarat, India; for exhibition which includes TEAM BVM's Rover.



Annual General Body Meeting

During the Month of December 2020, an Annual General Body Meeting for the TRS BVM Student Chapter Faculty and Student Members had organized. The meeting had hosted by Prof. Ashish Thakkar, Faculty Member, TRS BVM Student Chapter. Prof. (Dr.) Indrajit Patel, Principal BVM Engineering College, electrified the meet with his inspiring words and flagged-off the virtual celebration ceremony for the exceptional results in the GUJCOST Robofest 1.0. Prof. (Dr.) Vinay Patel, Prof. (Dr.) Haresh Patolia and Prof. (Dr.) D. M. Patel, then mentioned the future goals for the year 2021 and congratulated the Robofest 1.0 winners, student members too presented their ideas for the same, and with a positive approach for the new year plans, the meeting had concluded.



OnShape Workshop

The Robotics Society (TRS) Student Chapter, BVM has successfully completed 4 days of online lecture series titled “Design Modelling using SAAS Platform - OnShape” which was scheduled from 27th January 2021 to 30th January 2021. About 200 students amongst all the levels and disciplines of the institute participated and benefited by the series of lectures through MS Team Live interaction online platform. OnShape is a computer-aided design software system, delivered over the Internet via a Software as a Service model.

Onshape Online Lecture series through MS Team platform on
"DESIGN MODELLING USING SAAS PLATFORM - ONSHAPE"
On 27, 28 & 29 January, 2021 (6:00 pm to 07:30 pm) and 30 January, 2021 (11 am to 1 pm)

Patron
Prof. (Dr.) I. N. Patel
(Principal, BVM)

Program convener
Prof. (Dr.) V. J. Patel
Prof. (Dr.) D. M. Patel

Faculty coordinator
Prof. V. R. Singh
Prof. A. M. Thakkar
Prof. A. B. Damor

Student coordinator
Mr. Keivalya Pandya
Mr. Jay Goswami
Ms. Vaidehi Shah

Resource Person
Prof. J. R. Koisha

Organized by
The Robotic Society Students Chapter
BIRLA VISHVAKARMA MAHAVIDYALAYA (AN AUTONOMOUS INSTITUTION)
Managed by Charutar Vidya Mandal, Vallabh Vidyanagar - 388120, Gujarat
Website: <https://www.bvmengineering.ac.in/trs/>
Contact Person: Prof. V. R. Singh (9409189579) (vijaypratap.singh@bvmengineering.ac.in)

Scan QR code to register yourself

To become a member of The Robotic Society mail us on "trs@bvmengineering.ac.in"

The Workshop was conducted by Faculty Expert Prof. J R Koisha, Mechanical Department, BVM Engineering college. The topics covered in the series were,

- Growing popularity of OnShape in industries due to cloud facilities
- Sketch, line, constrains, parameters
- Extrude, revolve, sweep, plane, loft, shell
- Draft, fillet, split, linear & curve pattern
- Hands-on project - Bench-vice part assembly
- Material properties, mass properties, animate
- Drawing, geometric tolerance, bill-of-material table, mechanism, revolute

Robofest 2.0 – Level 1

TRS BVM Student Chapter team has achieved exceptional results in GUJCOST ROBOFEST 1.0, 7 Teams of TRS BVM Student chapter student members have taken part in GUJCOST ROBOFEST 2.0 announced in October 2020. The Robot Making Categories in RBOFEST 2.0 for which the teams have taken part are,

- Four-legged Quadruped Robot
- Underwater Robot
- Rover: 8 Wheeled All-Terrain Robot
- Prosthetic Limbs
- Internal Pipe Climbing Robot
- External Pipe Climbing Robot
- Microrobots

The competition includes 3 Levels; Level 1: Ideation/Concept; Level 2: Proof of Concept (POC); Level 3: Prototype Submission. All teams were determined in their work and actively finished the concept design. Out of 7 teams, 5 teams qualified level 1. Each qualified team won a reward of ₹50,000 for their Ideation in creating the robots. The Teams are,

TEAM UNDERWATER ROBOT

Under the guidance of Prof. (Dr.) D. M. Patel, Faculty Member, TRS BVM Student Chapter, students designed the Under Water Robot. The Robot can be used for surveying, object identification, vessel hull inspections, and natural calamities conditions.

Team Members:

Mr. Darshit Darji (2nd Year, Electronics Department)
 Mr. Vrushal Vara (4th Year, Electronics Department)
 Mr. Rutvik Valand (4th Year, Electronics Department)
 Mr. Vivek Solanki (4th Year, Electronics Department)
 Mr. Naitik Dalwadi (3rd Year, Mechanical Department)

TEAM PROSTHETIC LIMBS

Prof. Ashish Thakkar, Faculty Member, TRS BVM Student Chapter, and Team designed this robot. The robot helps people sense and feel touch by attaching the prosthetic hand. It is a working model of hand for making mimic movements of the hand.

Team Members:

Mr. Jay Goswami (2nd Year, Electronics Department)

Ms. Vaidehi Shah (2nd Year, Electronics Department)
Mr. Keivalya Pandya (2nd Year, Mechanical Department)
Mr. Raunak Abhani (2nd Year, Mechanical Department)
Mr. Deep Domadiya (2nd Year, Mechanical Department)

TEAM PIPE CLIMBING ROBOT

Prof. (Dr.) Rajiv Gandhi, Faculty Member, TRS BVM Student Chapter, and Team worked on Pipe Climbing Robot. This robot can climb a pipe vertically at least 30 feet above the ground and can stay at the assigned position for 1 minute and come down at the same speed.

Team Members:

Mr. Amaan Shaikh (3rd Year, Mechanical Department)
Mr. Zuber Makrani (3rd Year, Mechanical Department)
Mr. Ayush Patel (3rd Year, Mechanical Department)
Mr. Parth Makvana (3rd Year, Mechanical Department)
Mr. Hrushikesh Vegad (2nd Year, Electronics Department)

TEAM MICROROBOTS

Prof. Dr. Mehfusa S Holia, Faculty Member, TRS BVM Student Chapter, and the team worked on this robot. This project is based on Swarm Robotics and will have a varied application in Instruction-based Mass Robot Working.

Team Members:

Mr. Ishwariy Joshi (4th Year, Electronics Department)
Mr. Vishvas Suthar (3rd Year, Mechanical Department)
Mr. Dipesh Vadhvani (2nd Year, Electronics Department)
Mr. Vivek Solanki (4th Year, Electronics Department)
Mr. Rutvik Valand (4th Year, Electronics Department)

TEAM FOUR-LEGGED ROBOT

Prof. (Dr.) Haresh Patolia, Faculty Member, TRS BVM Student Chapter, and the team worked on the Quadruped Robot. It is a Bio-Mimic Robot of Four-legged animals which can have surface motion, hill climbing with a limit-angle. The

robot can be used for inspection of any area where human access limits with active camera vision and remote control.

Team Members:

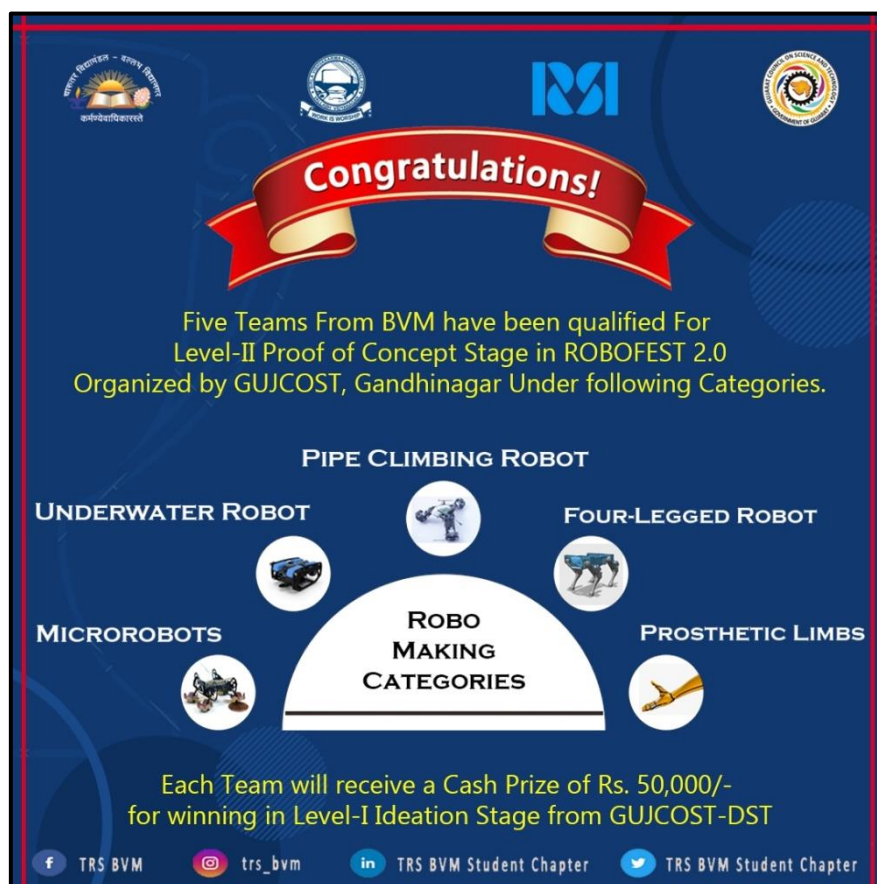
Mr. Jay Prajapati (3rd Year, Mechanical Department)

Mr. Ishan Mohite (3rd Year, Mechanical Department)

Mr. Manav Thakkar (3rd Year, Mechanical Department)

Mr. Pawan Patel (3rd Year, Mechanical Department)

Mr. Parth Panchal (3rd Year, Mechanical Department)



ARTPARK Robot Challenge – 1st Round

One Team from the TRS BVM Students' Chapter has participated in the Robotics Challenge: A national-level Robotics competition organized by ARTPARK.

ARTPARK is an autonomous section-8, not-for-profit company, a joint initiative of IISc and Alfoundry, seed-funded by DST (Department of Science and Technology) and GoK (Government of Karnataka). It is currently incubated at the Robert Bosch Centre for Cyber-Physical Systems at IISc. it is committed to

leveraging AI & Robotics in a mission-driven model to bring a better quality of life & access to resources for these billions. In this competition, participants have to make a completely autonomous robot for janitorial tasks for washrooms. There are a total of three rounds, in the first-round participants have to submit the raw design/idea of the project, and the simulation part will be in the second round, and the last round is to make a prototype of the project.

Team Janitics, from TRS BVM, successfully cleared the first round and selected for the second round. The team secured their place in TOP 29 teams all over India. Currently, this project is ongoing and the team is working on it for the second round.

Team Members:

Prof. (Dr.) Vinay Patel (Mentor)

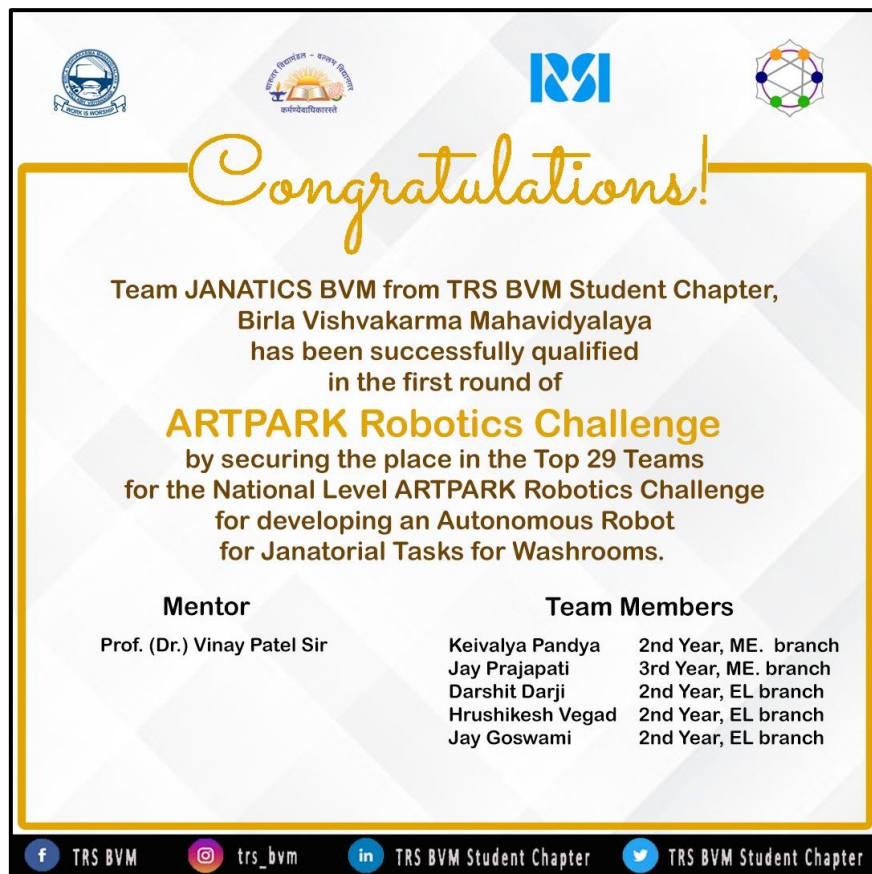
Mr. Keivalya Pandya (2nd year, Mechanical Engineering)

Mr. Jay Prajapati (3rd year, Mechanical Engineering)

Mr. Jay Goswami (2nd year, Electronics Engineering)

Mr. Darshit Darji (2nd year, Electronics Engineering)

Mr. Hrushikesh Vegad (2nd year, Electronics Engineering)



Student Committee 2020-2021

Sr. No.	Post		Member
1	Secretary		Sahil Vaghela
2	Joint Secretary		Vrushal Vara
			Harshil Patel
3	Treasurer		Ishwariy Joshi
4	R&D Leads		Jay Prajapati
			Rutvik Patel
			Rutvik Valand
			Yukti Patel
5	Department Coordinator	Mechanical Department	Ishan Mohite
		Electronics Department	Ved Bhonsele
		EC Department	Heramb Dahivalkar
		IT Department	Param Shah
		Production Department	Pranav Shah
6	Finance Leads		Panchal Parth
			Pawan Patel
7	Inventory Leads		Pratham Barve
8	Documentation Leads		Vishvas Suthar
9	Graphics Leads		Amaan Shaikh
10	Developer Leads		Deep Kapadia

Future Vision

TRS BVM Student Chapter received many opportunities this year and even excelled in various competitions we look forward to keeping the streak of excelling going on. We look forward to developing a maker's space where all the students can explore different futuristic tech and concepts with industrial exposure. To inspire young minds to the driving force in the field of robotics, we plan to engage them in exciting, mentor-based programs and competitions that build engineering skills, inspire innovation, and foster well-rounded life capabilities including self-confidence, communication, and leadership. We have also been planning to collaborate and take funds from the SSIP and make various other industrial or bio-animal or machinery robots by ourselves in our laboratory. We strongly believe in project development which makes us actively participate in Hackathons, Ideathons, and many more competitions organized at the national as well as International level right from the outset of membership of the TRS BVM Team. We even plan to participate in well-known competitions such as Robocons and E-Yantra. We aim to develop integrated systems for various projects to work with different technologies and build futuristic projects.

TRS BVM hopes to provide a unique, challenging learning environment that inspires young minds to apply and sharpen their science, technology, engineering, and math skills. Through a series of competitions starting virtually online and aboard the International Space Station, students exercise their creative problem-solving skills and take on real-world design problems. With a zero cost, zero setups, web-based environment that uses the latest web technologies, TRS BVM provides students worldwide with a test-bed to carry out space experiments.

All TRS BVM competitions are tied in some way to actual space research. By using crowdsourcing and other technologies, one-day Zero Robotics aims to substantively involve students in the design and testing process for space software.

