



FORMULA
MANIPAL
Engineered with Passion

MAY 2023 ISSUE

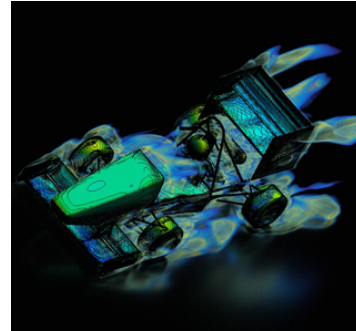
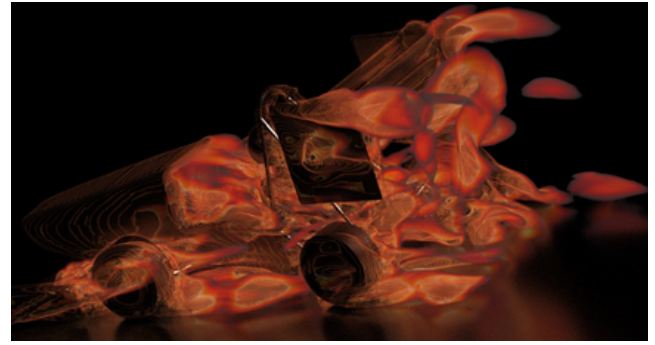
FORMULA MONTHLY



- Keeping up with Formula Manipal
- How Formula Student shapes us to Become the Engineers of Tomorrow
- Thanking our Title Sponsor-Analog Devices



This month has been challenging but quite rewarding for the entire team. During Endurance testing, we suffered damage to our fuel pump where it got overheated due to fuel starvation, but the team was able to quickly procure spares and continue testing. Apart from getting the car ready for the upcoming international competitions, our team also participated in the Rulebook Quiz for Formula Bharat 2024. **We are proud to announce that our team qualified as CO1 and EO3 for Formula Bharat 2024.** Our team is ecstatic and is looking forward to performing like never before in the upcoming competitions. The team is also participating in the Pi-EV 2023 for conceptual Powertrain-Design



MECHANICAL

- Our Structures system has designed the new EV chassis, they are currently designing the required fixtures and are gearing up to manufacture the EV chassis.
- Apart from this, the Structures subsystem is also working tirelessly to get the CV chassis ready for internationals.
- The Vehicle Dynamics subsystem has designed and finalized the suspension design for the new EV. The subsystem is also making sure the current CV is ready for the upcoming international competitions.
- The Engine subsystem has serviced the engine and is running the last checks to make sure the car runs perfectly in testing and in the competitions.
- The EPT subsystem has finalized the TSAC and ECS box CAD assembly, furthermore, they have prototyped modules for the Battery pack.
- Our Aerodynamics subsystem has been working on Aeromapping the FMXX1, furthermore, they have also fabricated the CFRP wings by wet layup.

ELECTRONICS&CONTROLS

- The Electronics subsystem has soldered and assembled the two safety circuit PCBs namely BSPD and SCS. The team is currently statically testing both the PCBs to ensure their reliability when put in the car. Minor rework on the Wiring Harness was carried out and was put back in the car ensuring proper routing and packaging of all the nodes of the Harness.
- The Control Systems team has tested the BMS setup comprising of the Orion Thermistor pack and LTC slaves and seems promising enough to move forward in procuring the whole setup.
- Further, according to new rule changes, EV safety circuit design will have to be revised and progress has been started on it.

DRIVERLESS

- Trained three Machine Learning models with varying parameters on the FSOCO dataset to improve Object Detection and Pose Estimation.
- Interfaced an LCD touchscreen to act as the Autonomous Mission Indicator. The touchscreen allows the user to interact with the system and control the autonomous mission.
- Wrote a Python module to enable CAN communication using CANdapter. The module is integrated with our testing application allowing us to transmit throttle commands directly to the motor controller.

HOW FORMULA STUDENT SHAPES US TO BECOME THE ENGINEERS OF TOMORROW



Formula Student, the world's most renowned engineering competition, where teams of students design, build, and race their formula-style race cars provides an incredible platform for engineering students to showcase their knowledge, skills, and talents in a highly competitive environment. This competition has grown in popularity over the years and has become a melting pot of innovation, creativity, and technical expertise. Participating in Formula Student provides students with real-world engineering and life skills that shape them to become the engineers of tomorrow.



The competition requires students to work in teams, which teaches us essential collaboration and communication skills. It demands critical thinking, problem-solving, and the ability to work under pressure, which are qualities required for everyday life.

One of the most significant benefits is the hands-on experience we gain in designing and building a race car from scratch. We all learn to integrate mechanical, electrical, and software components, which gives an understanding of the complexities of modern engineering. We are exposed to industry-standard tools and techniques such as using CAD software to design the car, perform analysis, and simulate performance. It also fosters an environment of innovation and creativity by challenging us each year to come up with new and innovative ideas to improve the performance of our cars.

Participating in Formula Student allows us to network with industry professionals as the competition attracts top engineering firms, and students get the chance to meet and interact with professionals in the field. This networking opportunity can lead to internships, job offers, and mentorship, which are invaluable to us.

Being a team member of Formula Manipl teaches us more than just engineering skills; it is a microcosm of life itself. From design to testing to competing, we learn the value of teamwork, perseverance, and adaptability. We've learned that success requires not only technical excellence but also effective communication, leadership, time management, and external support from our college and sponsors. In short, Formula Manipl is a first glance at the challenges and opportunities we will be facing in the real world.

Bridging the physical and digital world for breakthrough innovation

From the music we love to the cars we drive; analog technology is all around us. For over 50 years, Analog Devices (ADI) has been at the forefront of this technology, delivering cutting-edge solutions to some of the world's most complex problems. Whether it's providing reliable sensors, circuit boards etc for self-driving cars or creating state-of-the-art electric equipment, ADI's analog and mixed-signal technology is the backbone of modern innovation. Their products range from amplifiers, converters, switches to sensors, signal processors, and power management solutions.

More importantly, ADI is committed to sustainability and making a positive impact on the world. Their products help to reduce energy consumption and improve efficiency in industries ranging from healthcare to telecommunications. ADI's technology is helping to make the world a better place, one analog solution at a time.

Every team member of Formula Manipal works incredibly hard to design, build, and compete with the best race car we possibly fabricate. From the mechanical engineers who design the chassis, suspension, transmission etc to the electrical engineers who develop the electronics and control systems, each member puts their maximum effort into the project. Analog Devices' sponsorship acknowledges the hard work and dedication of all the team members, motivating them to continue pursuing their passion for racing and striving for excellence.

We would like to express our sincere gratitude to Analog Devices for generously sponsoring our team. They have sponsored us with their high-quality, durable and reliable Battery Monitor Power Management Evaluation boards. Their support has been instrumental in enabling our team design and build our race car and compete on a national and international level. A huge thanks to the team at Analog Devices who put in their time and effort to make this collaboration possible, so that we can push the boundaries of what is possible and pursue our passion for designing, fabricating and testing our race car with even greater zeal. We are truly honored to have them as our sponsors and partners in our journey to excellence and we look forward to several more competition seasons with Analog Devices.

Thank you
TO OUR SPONSORS



MANIPAL
ACADEMY of HIGHER EDUCATION
(Institution of Eminence Deemed to be University)

SCHAEFFLER



SIEMENS



INSULA



M2M
REPAIRS





CC Buyers for the previous month

ARYA BOBADE

VEDANT SHIRKE

SAMAR JAKHAR

ARAV BAGGA

ANIRUDDH ANDE

ISHAAN PUREY

BUY A CC

**RS 1000 OR US \$20 IS ALL IT TAKES TO BE A PART OF
THE FORMULA MANIPAL FAMILY!**

**FOR FURTHER
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