

# ROBOTICS

*a newsletter about IMSA's FRC team*



## Competition Updates

*By the FRC Business Team with help from 2022 Board*

As the First Robotics Competition season comes to an end for the Titan Robotics #2022 team, we want to share with you our accomplishments and future plans.

Some of the major things to note from the Iowa Regional: When we arrived to competition the robot was 8lbs overweight, to pass inspections we worked with other teams, and the business team gave the Chairman's award presentation as well.

Weeks after the Iowa regional we attended the Midwest Regional, in a short time-frame we made a big comeback, notably: We were regional finalist, had a successful climb, Alliance partners with Team #2451 (PWNAGE) and Team #1732 (Hilltoppers), and the business team once again gave the Chairman's award presentation.

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## Season Recap

### Design Subteam

During the pre-season, the Design subteam trained with friendly Speed CAD competitions. The build-season was met with parts of the robot being prototyped in SolidWorks to prepare for assembly. The Prototypes also were used as a measurement aid for hand-cut materials. The Design Subteam manufactured tool paths via fusion and utilized the ShopBot CNC Machine. Future plans for the Design team include further CAD training for the existing members and preparation to bring new ones on.

### Mechanical Subteam

The Mechanical Subteam prototyped various designs during the build season. The subteam also compressed how the robot did what, and specified the dimensions so that materials could be cut and assembled. The mechanical Subteam played a large role in the construction of the robot as they helped with the assembly process: creating bumpers, and helping to make modifications after the initial assembly. Members of the mechanical subteam were tasked with maintaining tools and cleaning up the lab, but a select few were tasked with fixing the robot in the pit during the competition (due to the capacity size). In the future, the mechanical subteam plans to create a documentation and organization system for the lab equipment and tools for ease of use.

### Electrical Subteam

The Electrical Subteam is in charge of the set up of pneumatics and electrical equipment on the robot. The systems that the subteam was involved in was: intake, storage, shooter, and drive base. To complete the tasks listed, the subteam used pistons, a compressor, solenoids, falcon motors, and a falcon controller. The Electrical Subteam has plans to expand its curriculum, implement a more accessible electrical system, and improve the organization and efficiency of the subteam's work area.

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## Season Recap

### Programming Subteam

The Programming Subteam worked to better swerve drive in regard to field-oriented control. The Riemannian motion policies were also worked on in regard to multi-task motion generation, path following, and collision avoidance. Incremental automation such as limelight auto-aiming was deployed with the future hope of the robot being able to 'vision' its target. Sensor fusion using the Kalman filter was adapted during competition season. Old Titan Algorithms were reused to help programmers focus on developing other systems that needed more attention.

### Titan Software Subteam

The Titan Software subteam worked during the pre-season to effectively deploy the FRC scouting and data analysis app. The app includes API integration for data synchronization and data analysis techniques to make use of the collected information. Usage of the application played a role in both regional competitions that the team attended: at the Iowa Regional the team gained pre-match information about competitors, and gave critical match insight that facilitated the development of successful strategies. At the Midwest Regional the application played a crucial role in elimination round performance, and contributed to the performance of the Titan Robotics team.

### Business Subteam

The Business Subteam is composed of three divisions: Finances, Outreach, & Relations. During the pre-season, finances worked on creating a budget plan which helped the subteam to create a 2022 Sponsorship Package, and a 2021-2022 Business Plan. Relations worked during the pre-season to create informational outreach shared through the newsletters, social medias, and emails to parents, students at IMSA, mentors, and sponsors. The Business Subteam also put together a Robotics Bonanza at the start of the season to show the team's game plan for this season & what they hope to accomplish. The subteam worked with FLL (FIRST Lego League), and GirlsIN2STEM (a local program) to create volunteering opportunities for members of the Titan Robotics team. Future focuses for the Business Subteam is to work on the Titan Robotics website so that information can be efficiently displayed, and for the team to expand its outreach opportunities.

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# Senior Recognitions

## Julie Lima

Julie Lima has been on the Titan Robotics FRC team for all three years during her time at IMSA, and has served as a valuable member of the Mechanical subteam as a Mechanical Specialist. Some of Julie's favorite memories on the team are spending nights with the team at hotels during competitions and she plans to stay involved with the team to help out in any way she can. In the upcoming school year, she will attend the University of Illinois at Urbana Champaign where she is majoring in Computer Science.

## Cor Sirais

Cor Sirais served as the Titan Robotics' Business Head for two years and was on the business subteam during their sophomore year. They are happy to have gotten some valuable skills from their time on the team, such as organization, speaking, and presenting skills. Cor is heading off to the University of California, Irvine, and is planning to still stay involved with FIRST.

## Dean Oquendo

During his three years on the team, Dean Oquendo has been on both the Mechanical and Business subteams. He says that some of his favorite memories on the team have come from having fun at competitions. Dean is going to college at the Illinois Institute of Technology where he plans to major in Chemistry.

## Nathan Kilmer

Nathan Kilmer is also a three-year member of the Titan Robotics FRC team and has been on both the Mechanical and Design & Integration subteams. This past year, he has served as the head of the Mechanical subteam. In the upcoming school year, Nathan will be going to Purdue University to study Aerospace Engineering and will be a mentor for the team.

## Grayson Pacourek

Grayson Pacourek was this previous year's Design & Integration Head and taught many members of the team valuable CAD skills. Some of his favorite memories on the team include putting in the work right before competitions to finish the robot, as well as staying with the team during competitions at hotels. Grayson will be heading off to the University of Illinois at Urbana-Champaign to study Mechanical Engineering.

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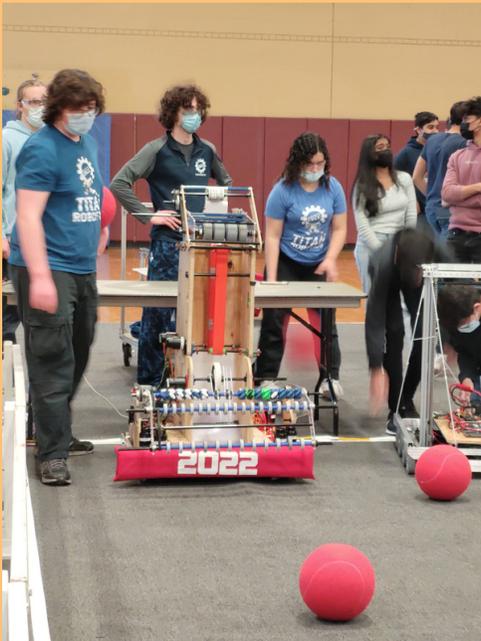
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To the left is a picture from when the team went to Gear it Forward's Week Zero event to prep for the competition and collaborate with teams!



Above is a picture from the Iowa Regionals where our mentors are in the pits ready to help us!



Above is a picture from the Midwest regionals where you can see our team captain (middle) holding the award!

To the left is our wonderful Coach, Grant helping us lift the robot into a practice field at the Iowa Regionals.

A BIG THANKS TO ALL  
OF OUR SPONSORS!



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THANK YOU FOR READING!

Look out for the next newsletter soon!

