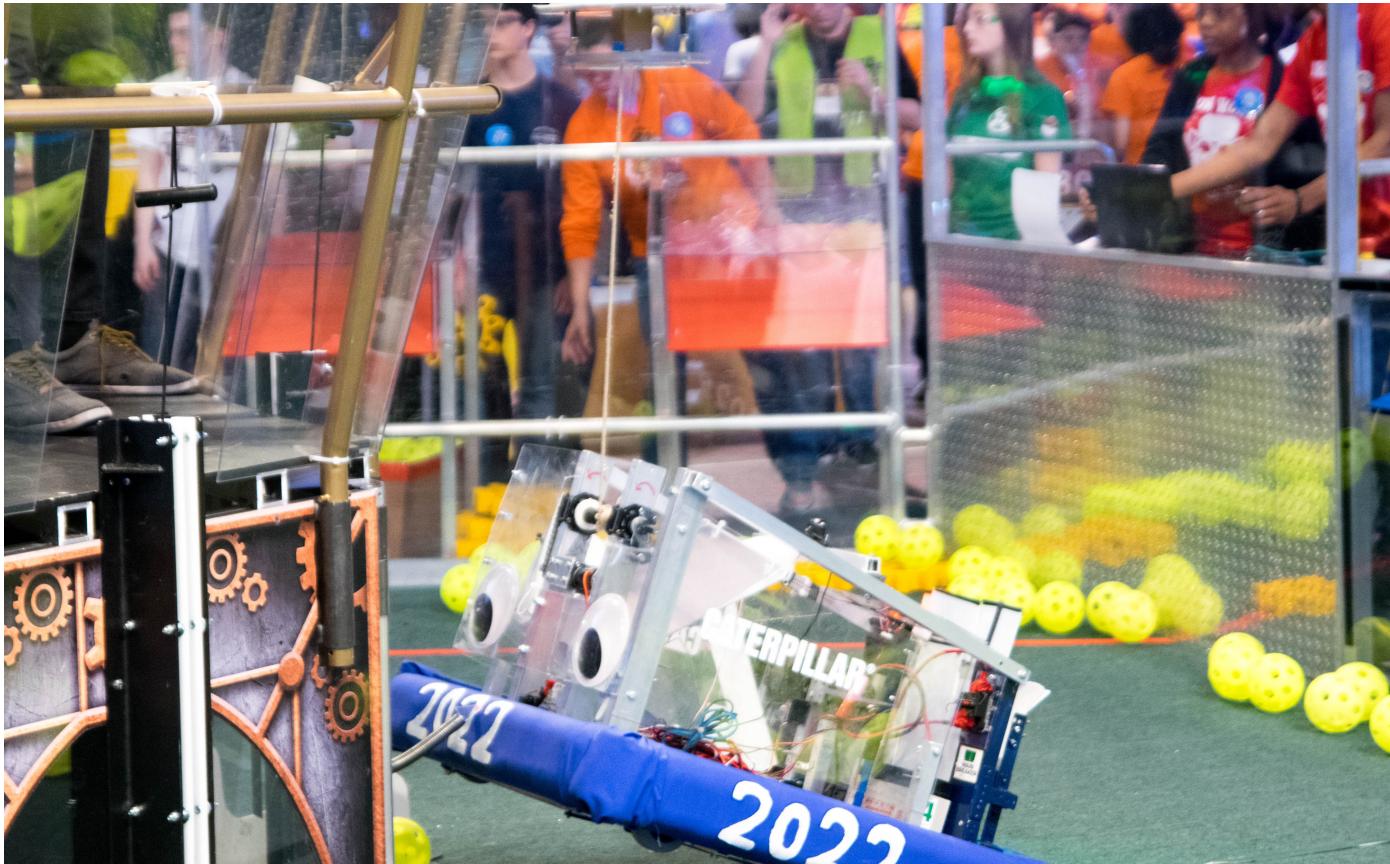


# TITAN ROBOTICS BUSINESS PLAN



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## MISSION STATEMENT

Titan Robotics, FRC Team 2022, inspires leadership and technical capability in members through rigorous FIRST competition training, outreach demonstrations, and volunteering to inspire local youth in STEM.

## WHO ARE WE?

FRC Team 2022, Titan Robotics, is a high school robotics team made up of students from the Illinois Mathematics and Science Academy (IMSA). Located in Aurora, IL, IMSA is a residential high school that accepts gifted students from across the state, making our backgrounds diverse and impacts far-reaching. We compete in the FIRST Robotics Competition (FRC) and other off-season competitions, which teaches our members technical skills, such as mechanical, programming, electrical, and Computer Aided Design (CAD). Team members also have the opportunity to develop business, leadership, and communication skills.

# WHAT IS FIRST?

FIRST (For Inspiration and Recognition of Science and Technology) was founded in 1989 to inspire young people's interest and participation in science and technology.

“

***the hardest fun you'll ever have***

Based in Manchester, NH, the 501(c)(3) non-profit public charity designs accessible, innovative programs that motivate young people to pursue education and career opportunities in science, technology, engineering, and math, while building self-confidence, knowledge, and life skills. FIRST, as a program, is more than robots.

Participation in FIRST helps encourage students to pursue education and careers in STEM-related fields, inspiring them to become leaders and innovators in 21st century industry.

Combining the excitement of sport with the rigors of science and technology,



we call the FIRST Robotics Competition the ultimate trial for the mind.

High school student participants call it 'the hardest fun you'll ever have.'

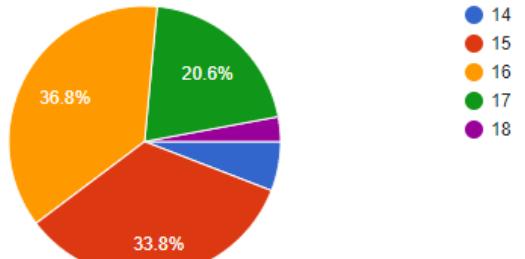
Under strict rules, limited resources, and an intense six-week season, teams of students are challenged to raise funds, design a team "brand," hone teamwork skills, and build & program industrial-size robots to play a difficult field game against like-minded competitors. It's as close to real-world engineering as students can get. Volunteer professional mentors lend their time and talents to guide each team. Each season ends with an exciting FIRST Championship.

retrieved from [firstinspires.org](http://firstinspires.org)

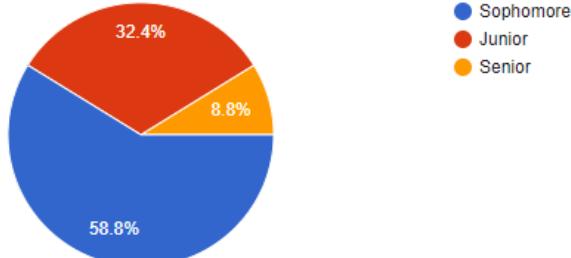
FRC Team 2022, Titan Robotics, was founded in fall 2006 at the Illinois Mathematics and Science Academy (IMSA) in Aurora, Illinois. With three members and one adult mentor, Titan's first season was one of scarcity, with only hand tools in a small, carpeted, club room. Since then, the team has grown to more than 70 members and 16 mentors, while remaining student-led. With mentor guidance, veteran students lead project groups and ensure that every student has a chance to work hands-on with the robot.

## DEMOGRAPHICS

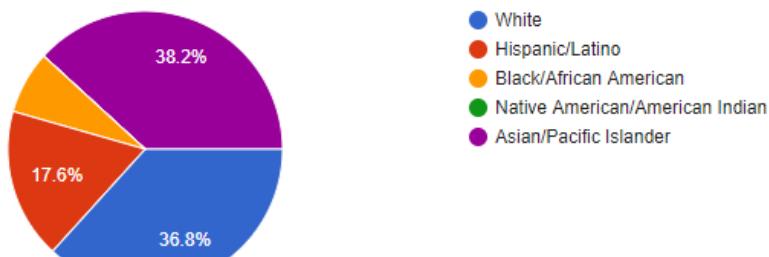
### AGE DISTRIBUTION



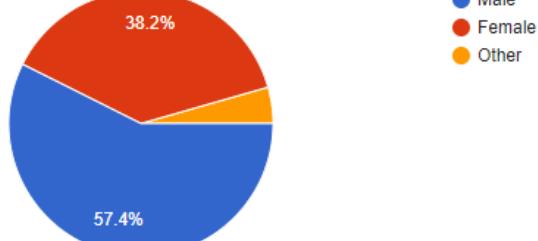
### GRADE DISTRIBUTION



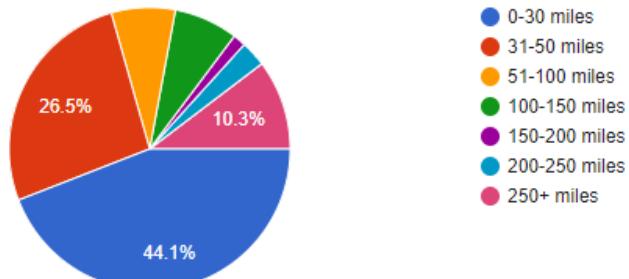
### RACE/ETHNICITY



### GENDER IDENTITY



### DISTANCE FROM IMSA



## SPONSORS

Sponsorship provides support, including financial contributions, in-kind donations, employee volunteerism and mentoring, provides vital resources for FIRST organizational growth

retrieved from [firstinspires.org](http://firstinspires.org)

Titan Robotics is sponsored by:

- Illinois Mathematics and Science Academy
- Caterpillar
- Bachman Machine Company
- Share Machining
- Gus Berthold Electric
- Vital Proteins

## MENTORS

Mentors and Coaches are individuals from all backgrounds and disciplines who work with students to share their knowledge and guide them through the season. Many Mentors contribute on a weekly basis during competition season, or support the team with subject matter expertise on an as needed basis. Teams may have additional or more specialized roles or a combination of roles as needed. In addition, Mentors help to foster the idea of Gracious Professionalism® and have the students do as much of the work as possible.

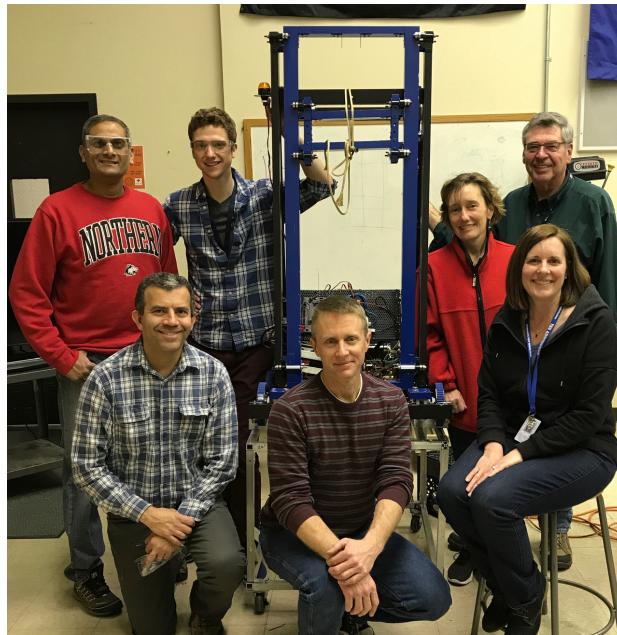
retrieved from [firstinspires.org](http://firstinspires.org)

Titan Robotics Mentors are...

- IMSA employees
- Team members' parents
- Retired Caterpillar engineers
- Computer science and robotics professors from Aurora University
- Robotics students from Aurora University

## OUTREACH

Students volunteer at local robotics events, serving both outside and inside IMSA. Team members regularly volunteer to demonstrate at IMSA's Preview Days to exhibit past robots, while exposing prospective, STEM-oriented students to the FIRST program. Titan Robotics also organizes volunteering opportunities at local FLL and FTC competitions, held by FIRST for younger audiences: grades 3-5 and grades 6-9, respectively.



## AFFILIATION BENEFITS

### Student Benefits

- master technical skills such as mechanical, CAD, electrical, programming
- work with professional mentors
- develop leadership skills
- perform community outreach
- connect with students from outside of the IMSA community
- gain entrepreneurial experience
- practice teamwork in a professional environment
- have fun!

### Partner Benefits

- inspire STEAM passions in students of all ages
- develop technical skills for potential employees
- charitable giving
- spread brand name throughout communities in and around Illinois
- request robot exhibition
- promotion to IMSA community
- social media promotion
- company name advertised at FRC competitions and on the robot
- R&D testing for mechanical parts
- field trip tours

### Mentor Benefits

- provide a rewarding teaching opportunity
- provide community service to communities all around Illinois
- attend competition with team
- have fun!

### IMSA Benefits

- admission and recruitment, as FIRST Robotics Competition participation is sought after in prospective students
- fits school mission of engaging STEM activity for students
- provides a way to engage with the community through our outreach events

## SPREADING FIRST

Titan Robotics has helped to start an FTC team, an FLL team, and numerous FRC teams. These teams are encouraged to work hard and demonstrate FIRST's core values. Mentors follow the FIRST principle of allowing the students on the team take initiative, while guiding the team along with lessons on everything from programming to team building. Individual team members help in their local communities and at various outreach events by volunteering at regional competition, training FLL mentors, and volunteering at STEM summer camps. Titan Robotics has organized two volunteer trips to FLL competitions and one to an FTC competition in the current season.

## ACHIEVEMENTS AND AWARDS

Judges Award, 2007 Midwest Regional  
Highest Rookie Seed, 2007 Midwest Regional  
Safety Award, 2011 Wisconsin Regional  
Safety Award, 2011 Midwest Regional  
Winner & advanced to Worlds, 2012 Midwest Regional  
Creativity in Design Award, 2014 Midwest Regional  
Quarterfinalist, 2017 Midwest Regional  
Entrepreneurship Award, 2018 St.Louis Regional  
FIRST Dean's List Finalist Award (Anisha Gubba), 2018 St.Louis Regional

We display Gracious Professionalism  
and Cooperation in everything we do.  
What we discover is more important  
than what we win.

We are a team and we share our  
experiences with others.

retrieved from [firstinspires.org](http://firstinspires.org)



## TEAM STRUCTURE

Titan Robotics has 5 main subteams:

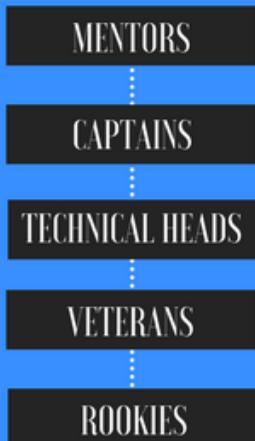
- mechanical
- electrical
- programming
- CAD
- business

Each subteam has one head, except mechanical, which has both a junior and senior mechanical head. The two team captains are responsible for leading the team and facilitating communication between students and mentors.

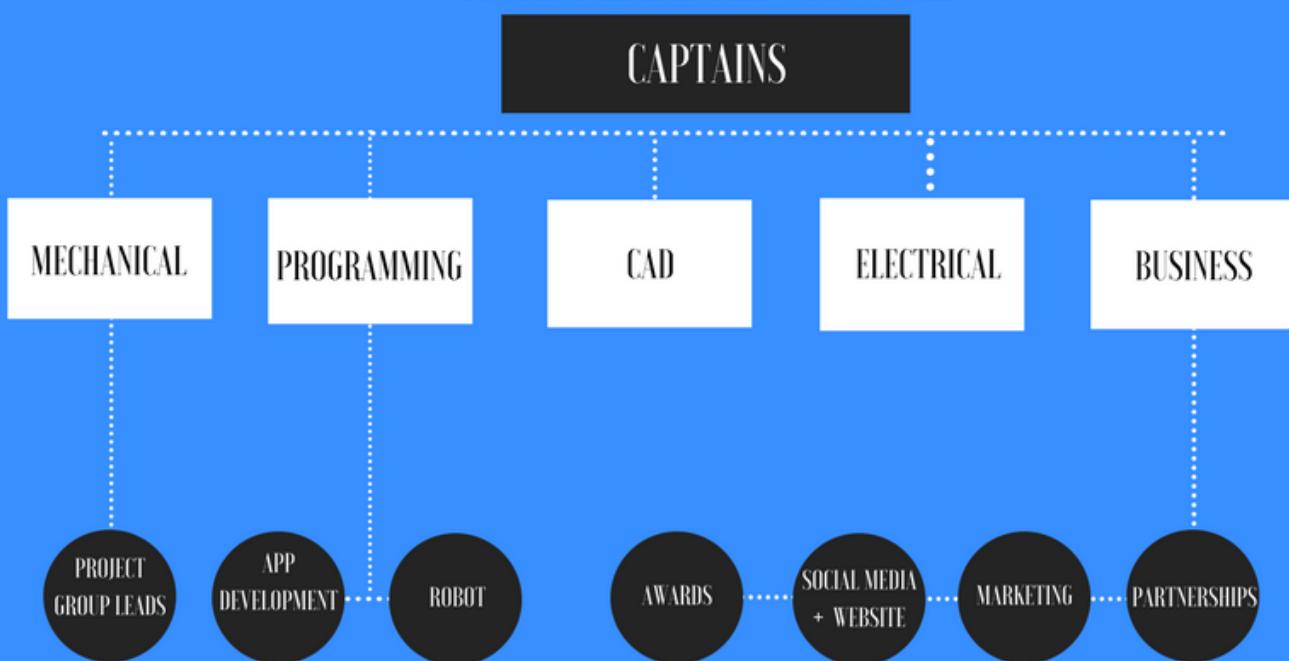
## STUDENT LEADERSHIP STRUCTURE

As a student-led team, Student Leadership Structure is crucial to Titan Robotics' success. Student Leadership consists of Captains, Technical Heads, and Business Heads: juniors and/or seniors who have proven their commitment to the team with experience and knowledge in their subteam. Each subteam has one to two heads in charge of leading the subteam by delegating tasks and ensuring that they are completed in a timely manner.

### GENERAL TEAM STRUCTURE



### STUDENT LEADERSHIP STRUCTURE



## TEAM CAPTAINS

- Heads of Student Leadership Team
- Provide project management to ensure deadlines are met
- Call leadership meetings
- Provide focus and vision to the group
- Organize recruitment and training
- Liaison between team members, coach and mentors
- Organize lab sessions with Technical Heads

## TECHNICAL HEADS - MECHANICAL, CAD, ELECTRICAL, PROGRAMMING

- Develop curriculum and train team members
- Develop a means to pass down knowledge from year to year
- Supervise projects in their sub-team
- Mechanical (Senior and Junior) - Responsible for the mechanical design of the robot in conjunction with CAD
- Electrical - Manages all electrical aspects of the robot
- Programming - Manages all programming of the robot
- CAD - Manages the CAD for the robot

## BUSINESS HEAD

- Main contact for sponsors
- Manages team appearance and spirit
- Creates the business plan and sponsorship materials
- Facilitates sponsorships
- Manages social media and branding
- Recruits external mentors

## PRESEASON

### Summer

Titan Robotics is located at a residential high school that has a diverse community of students from all areas of Illinois. Most members live too far to commute during the summer, so Titan does not hold summer sessions. However, the leadership team utilizes this time to plan for next the season, by creating training and business material.

### Recruitment

In the past year, Titan Robotics has experienced considerable growth, from a team of 48 to 70+ members. Recruitment begins in late August of each year, when new students move into dorms on campus. Two general assemblies are held to attract potential new members. Attendees learn more about the team, its mission, and are given the opportunity to register. The first lab session explains FRC, and Titan's role as an FRC team, as well as displays our past robots and facilities.

### Training

Training sessions provide subteam-specific capabilities for rookies and veterans alike. All technical members must be certified in the basics of all technical subteams to ensure a safer, stronger foundation for the team. Members may choose to focus on multiple subteams to foster a variety of skills during build season. Veteran members are expected to assist subteam heads in training rookies, which helps reinforce their own knowledge through mastery of the basics. Preseason is a formative time for the team in terms of guidance, collaboration, and communication.

### Legacy/Organizational Memory

While most FRC teams are affiliated with four-year high schools, IMSA is a three-year school. Sufficient training and efficient transmission of knowledge and experience are important to ensure team sustainability. Seniors must focus on imparting knowledge to juniors and sophomores, so the team can continue running smoothly. Alumni connections are helpful to guide students through mechanical, electrical, programming, CAD, and business projects.

# SEASON

## Team Expectations

Titan Robotics expects committed, motivated members to work hard for the team. Lab work is observed in multiple dimensions, both quantitatively tracked and qualitatively judged. Hours are tracked, during offseason and season, and individual productivity reviewed. Members with satisfactory attendance are brought to regional events. IMSA's attendance policies prevail; if a student fails to meet an academic expectation, they must show a plan to ensure academic success. Above all, team members are expected to act in a way that strives for the ideals of Gracious Professionalism and Cooperation.

## Project Management

During prototyping, veteran members decide how to split up the robot into sub-assemblies; each sub-assembly is delegated to a project team. Two project leaders and several team members are assigned to each project team. Schedules are drafted to ensure that every sub-assembly is being worked on every day. Notes are taken and shared daily about what has been done and what needs to be done. Project group leaders report to Student Leadership members to ensure that the project moves forward.

## Safety

Titan Robotics follows strict safety measures to prevent injury. Lab policy requires safety glasses, earplugs, and closed toed shoes. Long, loose hair and baggy clothing are not allowed. Members are required to take a course designed to introduce the controls of equipment and safety protocol before operating any machinery or power tools. For more advanced machinery, trainees must watch instructional videos made available by the manufacturer. Machinery is periodically inspected to prevent hazardous situations. Every member is important to Titan's success, so we try our best to keep them all safe.

## BUDGET

| Item                                    | Annual Cost (\$)        | Description  |
|---|-------------------------|--|
| FIRST Registration Fee                  | 5,000                   | participation at 1 Regional Event, Kickoff Kit, associated materials, and support            |
| Robot Material                          | 4,000                   | FIRST-imposed maximum budget of \$5000 for robot   |
| Hardware & Prototyping                  | 3,000                   | auxiliary material and material used during prototyping                                      |
| Tools and Equipment                     | 1,000                   | repairs or replacements for tools in lab   |
| Team T-Shirts                           | 800                     | matching shirts in compliance with FIRST expectations  |
| Spirit and Outreach Items               | 600                     | buttons, wristbands, flags, mascot, pit banner, etc.   |
| Competition Transportation              | 1,000                   | bus transportation for 1 competition   |
| Competition Food                        | 1,500 (per competition) | students provided with all meals during competition  |
| Additional Competition Fee              | 4,000 (per competition) | registration fee for a second regional competition   |
| Additional Transportation and Hotel Fee | 5,000 (per competition) | bus transportation and hotel fee (due to farther location) for a second regional competition |
| Additional Competition Food             | 1,500 (per competition) | students meals for a second competition  |
| Emergency Money                         | 15,000                  | in the event that Titan qualifies for the World Championship                                 |
| Total Expenses                          | 27,400                  | overall cost for this season   |

## CASH FLOW

|                                  |                |
|----------------------------------|----------------|
| <b>STARTING BALANCE</b>          | <b>\$14000</b> |
| <b>CASH IN</b>                   |                |
| CATERPILLAR GRANT                | \$5000         |
| VITAL PROTEINS SPONSORSHIP       | \$10000        |
| <b>TOTAL CASH IN</b>             | <b>\$15000</b> |
| <b>CASH OUT</b>                  |                |
| ROBOT                            | \$4099         |
| TOOLS                            | \$110          |
| COMPETITION COSTS                | \$5000         |
| UPCOMING COSTS                   |                |
| TRANSPORTATION                   | \$1000         |
| COMPETITION EXPENSES (ST. LOUIS) | \$2400         |
| <b>TOTAL CASH OUT</b>            | <b>\$12609</b> |
| <b>ENDING BALANCE</b>            | <b>\$16391</b> |

## SWOT ANALYSIS

### STRENGTHS

- dedicated lab space
- large, geographically diverse team
- student-run/mentor-guided
- returning alumni
- members' strong interest in STEM
- various levels of background experience
- training programs for new members
- residential campus eliminates commute
- no school first week of season

### WEAKNESSES

- short-term parent mentors ( $\leq$  3 years)
- limited fundraising
- small building space
- lack of commitment due to rigorous schoolwork
- new to sponsorship
- mentors and students change quickly

### OPPORTUNITIES

- use school announcements and media to publicize team and recruit members
- ability to demo at local sponsor locations
- outreach with new FIRST teams
- hold open houses to show team's accomplishments and FIRST

### THREATS

- loss of team mentors due to burnout, graduation, or other commitments
- loss of students
- loss of funding
- inability to find additional sponsors
- lack of school support

## LEVELS



### Optimus Prime Partnership

**\$10,000+ donation**

Logo on robot (Large)

Logo on back of team shirts

Logo on pit banner

Logo on all marketing materials

Appearances at local corporate events (negotiated)

Inclusion in robot introduction at beginning of matches



### R2-D2 Partnership

**\$5,000-9,999 donation**

Logo on robot (Medium)

Logo on back of team shirts

Logo on pit banner

Logo on all marketing materials

Appearances at local corporate events (negotiated)



### C3PO Partnership

**\$1,000-4,999 donation**

Logo on robot (Medium)

Logo on back of team shirts

Logo on pit banner

Logo on all marketing materials

Appearances at local corporate events (negotiated)



### Wall-E Partnership

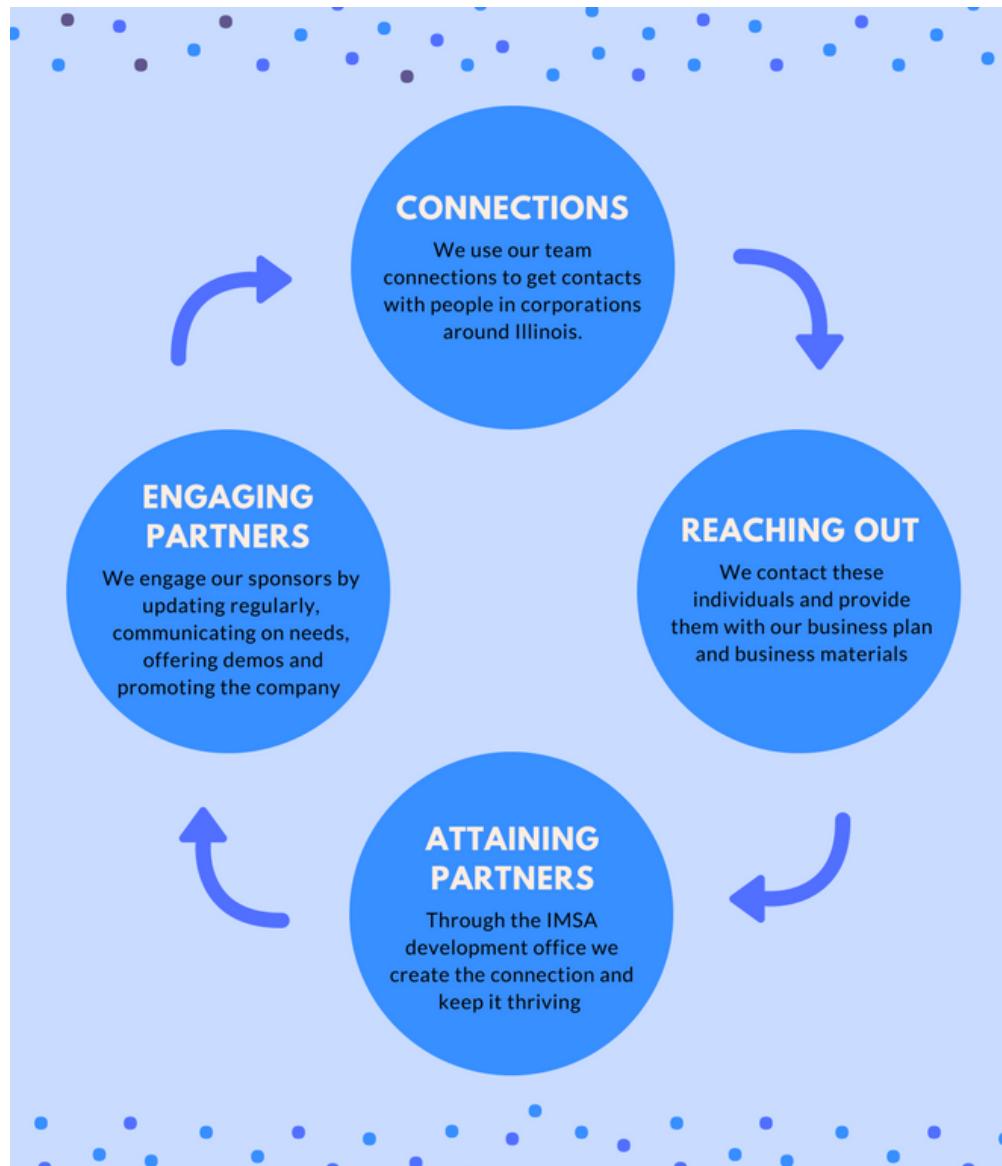
**\$250-999 donation**

Logo on robot (Small)

Logo on back of team shirts

Logo on pit banner

Logo on all marketing material



## PARTNERSHIPS



Titan Robotics is constantly looking for new partners to help us achieve running our team and creating a successful robot. Businesses can help in many ways, whether it be through monetary contributions, materials or assistance on our bot. Partners who help us monetarily are given levels to which they can choose to help with. Each level has certain benefits for the partner. We look for material sponsors who can help us machine parts of our robot that would be impossible in our lab. Some partners also help us by assisting mentorship and input on how to successfully engineer an object.

## DONATIONS

Titan Robotics gladly accepts tax-deductible personal donations at [www.IMSA.edu/giving](http://www.IMSA.edu/giving).

To donate online, click “online gift form”, select “Tribute Gift” at the bottom of the form, and type in “FIRST ROBOTICS TEAM.”

To donate through check, make a check out to the IMSA Fund, and include “FIRST ROBOTICS TEAM” in the memo line.

## PARTNERSHIPS

To indicate interest in corporate partnership, please contact:

Cynthia Hamilton  
IMSA's Grant Writer and Corporate Foundation Relation Manager  
630-907-5051  
[chamilton@IMSA.edu](mailto:chamilton@IMSA.edu)

# THANK YOU FOR YOUR SUPPORT!



VITAL PROTEINS®



Illinois Mathematics and Science Academy



BACHMAN  
MACHINE COMPANY



## CONTACT US

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