

MOUNT BARAN CHAIRISTIAN SCHOOL



BUSINESS PLAN 2020-202) FIRST® GAME CHANGERS SEASON





"Eagle Robotics will become the nexus in which **healthy competitive spirit** and **STEM education** converge.

Eagle Robotics seeks to become the model FIRST® program in Georgia, defined by competitive rigor and sustained excellence in leadership and engineering."

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Executive Sumary

A BRIEF OVERVIEW

Eagle Robotics is a diverse group of students, grades 9-12, with a unified desire to develop their God-given talents and abilities in Science, Technology, Engineering, and Mathematics, while honoring Him with a balance of professionalism, service, and infectious joviality.



PROGRAM AND TEAM INTRODUCTIONS

Eagle Robotics is the FIRST® (For Inspiration and Recognition of Science and Technology) robotics program at Mount Paran Christian School.

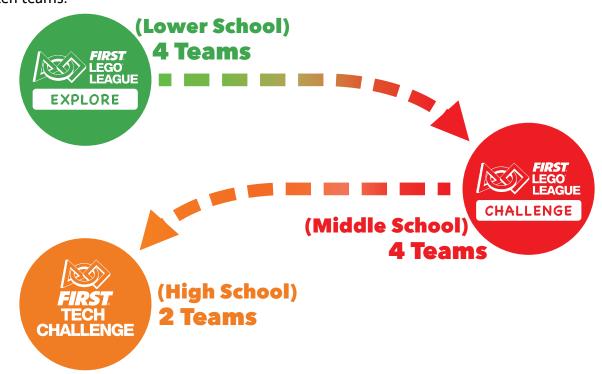
Students learn STEM skills, teamwork solutions, and much more through competitive robotics.

Members at the high school level of Eagle Robotics engage in a wide variety of roles and responsibilities through participation, including but not limited to the roles shown below.

EAGLE ROBOTICS			
DESIGN	CONTROL SYSTEMS	ELECTRICAL	MECHANICAL
OUTREACH	DOCUMENTATION	Business	MEDIA



Originally founded in 2003, Eagle Robotics now consists of over 98 participants who compete in one of three FIRST® programs based on their skill level. Eagle Robotics programs include ten teams:





Team 7373 | Carbon Fiber

- High school FIRST® Tech Challenge team comprised of experienced members
- Mentors the younger members of the program
- Exhibits the most developed level of STEM skills

Team 11364 | Diamond Plate

- High school FIRST® Tech Challenge team comprised of newer members.
- Gain's problem-solving, teamwork, and essential STEM skills.
- Focuses on building a robot and creating an engineering notebook





Competitive Success

2019-20 SEASON



Inspire Award 1st Place

Georgia State Championship - Team 7373

The highest award in the competition - "given to the team that best embodies the 'challenge' of the FIRST Tech Challenge program." This team "is an inspiration to other teams" and "showed success in performing the task of designing and building a robot."



Winning Alliance Captain

Georgia State Championship - Team 7373

Given to the team that excels in the robot game, winning the elimination matches as the captain of an alliance with two other teams.



Pemberton Division Finalist

Georgia State Championship - Team 11364

Given to teams who performed well in the robot game and advanced from qualification matches to the final matches within the Pemberton division.



Inspire Award 1st Place

League Tournament - Team 7373

This judged award is given to the team that best embodies the 'challenge' of the FIRST Tech Challenge program. The team that receives this award is a strong ambassador for FIRST programs and a role model FIRST team.



Winning Alliance 1st Pick

League Tournament - Team 11364

Given to the team that excels in the robot game, winning the elimination matches as a member of an alliance of two other teams.



2018-19 SEASON



Think Award Finalist

Houston World Championship - Team 11364

This judged award is given to the team that best reflects the journey the team took as they experienced the engineering design process during the build season.

Think Award 1st Place

Georgia State Championship - Team 11364

Inspire Award 1st Place

League Tournament - Team 11364

Connect Award

League Tournament - Team 7373

Inspire Award 3rd Place

Georgia State Championship - Team 11364

Inspire Award 2nd Place

League Tournament - Team 7373

2017-18 SEASON



Rockwell Collins Innovate Award

Georgia State Championship - Team 7373

This judged award is given to the team that has the most innovative and creative robot design solution to any specific components in the FIRST Tech Challenge game.

Semi-Finalist Alliance

Georgia State Championship - Both Teams

Inspire Award 2nd Place

League Tournament - Team 7373

Inspire Award 1st Place

League Tournament - Team 7373

Connect Award

League Tournament - Team 7373

2016-17 SEASON

Super-Regional Competitor

South Super-Regional Championship - Team 7373

Inspire Award 1st Place

Second Qualifier - Team 11364

Think Award 1st Place

Georgia State Championship - Team 7373

Inspire Award 1st Place

First Qualifier - Team 7373



Team Sumary

MEET THE TEAMS

The high school Eagle Robotics program currently incorporates two FIRST® Tech Challenge teams: Eagle Robotics Team 11364 Diamond Plate and Eagle Robotics Team 7373 Carbon Fiber. In total, there are nearly twenty students. The teams meet three times each week: Tuesdays and Thursdays after school and Saturdays from nine to one. Both teams are coached by Brad Smith, Mount Paran STEM Coordinator, and are mentored by John Quarles, an electrical engineer formerly with Lockheed Martin.





"Mount Paran Christian School is a place where faith and intellect grow as one. Our robotics program embraces the unique creation God has designed each student to be and fosters their curiosity, resilience, and creativity to better our community and the world. Our high school robotics students routinely give back to our school **community** by mentoring younger students and with their support the middle school program has increased exponentially the past two years. The opportunity afforded to our students to work with industry experts, learn skill sets for the work force and craft a level of expertise before entering college is a unique gift and a blessing."

- Tawanna Rusk

High School Head of Mount Paran Christian School



TEAM HISTORY

2003 | Eagle Robotics is Founded

In 2003, the late Professor R. Glenn Allen (Southern Polytechnic State University Mechanical Engineering) invited Mount Paran Christian School STEM Coordinator Brad Smith to the inaugural year of the Georgia hub of the organization called Boosting Engineering, Science, and Technology (BEST).

The team gratefully accepted his invitation, and thus Mount Paran's high school competition robotics team was born. Beginning with the BEST Fever game, the team went on to spend ten years playing in the BEST league.



2013 | Eagle Robotics Joins the FIRST® Program

In the 2013-14 season, Eagle Robotics made the transition from the BEST organization to FIRST®. Now a FIRST® Tech Challenge participant, Team 7373 Eagle Robotics thrived in the FIRST® environment and succeeded greatly both on and off the robotics field.

2015 | A Second Eagle Robotics Team is Formed

Following the RES-Q game (2015-16), Eagle Robotics accumulated so many members that a new team, Eagle Robotics Team 11364 Diamond Plate, was created. Team 7373 was then rebranded to Eagle Robotics Team 7373 Carbon Fiber to parallel the style of the new team. Adhering to the current structure, Team 11364 is comprised of first-year members focused solely on building a robot and compiling an engineering notebook, and returning, experienced team members operate Team 7373.





MEMBER ACTIVITIES AND MENTOR OPPORTUNITIES

Members of Eagle Robotics are provided with the opportunities to specialize in the following aspects of team activities: business, media, electrical, design, mechanical, and control systems. Adult instruction positions are also available to help guide students in these areas.

Design

- CAD all parts prior to manufacture, construction, or assembly
- Maintaining active CAD libraries, revisions, drawings, renderings, and animations
- 3D printer operation and maintenance
- CNC Mill operation and maintenance
- Training for team on 3D printing and CNC mill
- Managing archives of CAD from previous years or databases of kits of parts

Control Systems

- Learning and instructing Java or Blocks Programming
- Software licensing and installation
- Cloud storage management
- Software implementation and team training
- Programming the robot for both Autonomous and Tele-Op modes
- Calibrating and managing sensory equipment
- Coordinating controls with the drive team
- Documenting the code with flowcharts or other logic organizing tools

Mechanical

- Keeping teams tool-safe and developing training protocols
- Making sure tools are organized, maintained, and replenished when broken or worn
- Determining components and parts required for robot build
- Providing dimensioned drawings for CAD team, evidence of proof-ofconcept testing, proof of engineering modeling, and evidence of performance testing for the engineering notebook
- Constructing robot
- Keeping teams tool-safe and developing training protocols
- Making sure tools are organized, maintained, and replenished when broken or worn

Electrical

- Providing electrical schematic drawings
- Electrical hardware and solutions
- Electrical connection, soldering, wiring (routing), harnesses, and labeling
- Battery maintenance and charging
- Testing electrical components for functional integrity



Outreach

- FLL mentoring (coordinates participation) and service projects
- Hosting or attending scrimmages, and events
- Team relations at competitions (meet and greet, giveaways, scouting documents, and documenting assistance to other teams)
- Organizing trips to visit local engineering businesses
- Heads documentation of all outreach events

Media

- · Website and social media
- Web photos and videos
- Group email notices
- Event promotion
- Sponsor relations (sending thankyou letters, keeping in touch with sponsors, keeping sponsors informed on upcoming events)
- Coordinating outsourcing for graphics work
- Shirts and wearable gear
- Sponsor logos
- Photography and videography
- Coordinator for team portrait/robot portraits

Business

- Business Plan
- Bill of Materials
- Budgeting and accounting
- Fundraising (organization of events, solicitation, documentation of income)
- Purchasing and billing
- Branding and marketing strategy
- Coordinating pit booth printing, poster and flyer distribution, and other needed outsourcing for graphics work

Coach/Mentor

- Communications
- Student service through STEM
- Team safety and training
- Registering for competition events
- Field experiences/plant tours
- Overseeing general sponsor relations
- Moderating media and digital presence
- Fundraising
- Judge & leadership training
- Coordinating volunteers
- Transportation
- · Assisting in robot design



Core Values and Outreach

"Outreach at Eagle Robotics is an active, collective effort made to express our core values through giving back to the surrounding community, including other FIRST® teams, Mount Paran, and the local Kennesaw-Marietta area."

TEAM OUTREACH PRINCIPLES

We seek to "power" our robotics community

...by hosting FIRST® competitions, mentoring younger students, and helping our fellow FIRST® Tech Challenge competitors. Through this effort, we are working to ensure that those around us are the best that they can be. This is a reflection of our third core values, which affirms that "it's not all about us," as well as reinforcing our focus on living out the FIRST value of "Coopertition".

"Coopertition is displaying unqualified kindness and respect in the face of fierce competition. Coopertition is founded on the concept and a philosophy that teams can and should help and cooperate with each other even as they compete."

FIRST definition of Coopertition





We aim to educate our school community

...on internal opportunities available for them to actively pursue STEM since we are fortunate to have opportunities such as PLTW courses, robotics extracurriculars, STEM classes, and other STEM activities available from kindergarten through twelfth grade. Our goal is to encourage our school community to take advantage of these numerous learning opportunities.



We desire to encourage community STEM interest



...within both our local and worldwide community, for there are innumerable opportunities that come with STEM education and careers. We know that not all kids in our community have the chance to hear about many of these opportunities. To remedy this, we are seeking out opportunities to teach kids in the community about STEM through interactive activities.

We strive to connect with STEM professionals

...and local businesses, who are instrumental in giving us exposure to a wide variety of careers within STEM fields. Additionally, we aim to foster long-lasting relationships with these individuals or organizations to extend our aspiration of spreading STEM knowledge throughout our local community, making more students aware of local STEM opportunities.





TEAM SUSTAINABILITY PLAN

Strengthening Eagle Robotics Programs

Within Mount Paran Christian School, Eagle Robotics has grown outside of FIRST® Tech Challenge to incorporate four tiered middle school FIRST® LEGO League teams and a developed robotics program throughout the lower school.

Through this structure, students are able to start young in the FIRST® program within the

school, and as they move up in grade, they will also advance through the progression of FIRST®. This cycle creates a self-sustaining STEM pipeline. The ultimate goal of this is to enhance the school STEM culture by providing a wider opportunity for students of all ages to explore STEM as a life skill.

As we have in previous seasons, we will continue to regularly invest our time and resources into Mount Paran's FIRST® LEGO League teams, serving as mentors to them by helping with robot design and team presentations, while encouraging their growth in STEM interest.



Building Up Our Robotics Community

Each year since 2018, Eagle Robotics hosts a FIRST® Tech Challenge tournament on our campus to empower over 30 teams with a location to compete for advancement to the state championship. Additionally, Eagle Robotics hosted its inaugural FIRST® LEGO League tournament in 2019, providing youth ages 9-16 a engaging opportunity to compete and display the skills they learned during their season.

We will continue to offer regular use of our competition field space for local teams who do not have access to the same resources.





CORE VALUES

Core values are the backbone of all FIRST® Tech Challenge teams. The priorities, goals, passions, and visions of Eagle Robotics spring directly from its values. The values are embraced by each individual member as well as the corporate whole of the team. These values identify us as a family, a team, and most importantly, as Christian roboticists.

First Things First

"But **seek first His kingdom and His righteousness**, and all these things will be given to you as well." -Matthew 6:33

At the center of Eagle Robotics are three core values; the first of which, and the most prominent, is "First Things First," reflected in Matthew 6:33.

Therefore, "First Things First." declares that God comes before everything else, and when that principle is honored, the entirety of our priorities will fall in place according to God's will. One of the ways we incorporate this is by offering up corporate prayer before beginning any meeting or decision.

The Ability to Design and Manufacture is a Gift from God

"God spoke to Moses regarding these men. Moses records God's words as 'I have filled him [Bezalel] with the Spirit of God in wisdom, in understanding, in knowledge, and in all kinds of craftsmanship, to make artistic designs for work in gold, in silver, and in bronze, and in the cutting of stones for settings, and in the carving of wood, **that he may work in all kinds of craftsmanship.** And behold, **I Myself have appointed with him** Oholiab, the son of Ahisamach, of the tribe of Dan; and **in the hearts of all who are skillful I have put skill**, that they may make all that I have commanded you."" - Exodus 31:1-6

Our second core value is the belief that **the ability to design and manufacture is a gift from God.** This core value is reflected in Exodus 31:1-6.

In the light of the gifts that have been bestowed upon us, we believe it is both a duty and a privilege to hone these skills and exhibit them to the glory of the God that gave them to us.

It's Not All About Us

"**Do nothing out of selfish ambition or vain conceit**. Rather, in humility value others above yourselves, not looking to your own interests but each of you to the interests of the others." - Philippians 2:3-4

Finally, our third core value acts as a combination of the first two. We recognize that **it's not all about us.** Based on Philippians 2:3-4, it is both our honor and desire to use the skills God has given us in service to others.

The FIRST® program seeks to become more than robots by encouraging teams to engage in outreach. This entails going out into the local community to promote STEM. We take this a step further by volunteering our time and providing a Christian motivation behind our outreach.

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At-A-Slance

HIGHLIGHTS OF FIRST®



"FIRST® has provided me with the experience and knowledge for my future in a way that no other class or organization could."

- Aidan Hanson Junior, Member of Eagle Robotics Team 7373 Carbon Fiber

Founded over thirty years ago, FIRST® was established with the intent of expanding young people's interest in the STEM field, leading to new relationships, lasting hobbies, and future careers. Adding to this, FIRST® also builds on students' knowledge, life skills, and selfconfidence.

This is accomplished through engaging students from grades K-12 in challenging, mentorbased research and robotics programs. In each of these robotics programs, teams of students work through not only the process of designing a robot and programming it with instructions but will learn core values and how to present themselves to a judging panel as well.

"FIRST® is more than robots. The robots are a vehicle for students to learn important life skills. Kids often come in not knowing what to expect- of the program nor of themselves. They leave, even after the first season, with a vision, with confidence, and with a sense that they can create their own future."

> - Dean Kamen Founder of FIRST®





FIRST® Progression of Programs

FIRST® (For the Inspiration and Recognition of Science and Technology) encompasses four programs designed to provide STEM experiences for all different levels and age groups. Eagle Robotics teams at the high school level compete in the FIRST® Tech Challenge program, while lower and middle school teams participate in FIRST® LEGO® League programs. The table shown below gives detail about each of the event-based FIRST® programs.

	Overview	Participants	Event Season
FIRST LEGO LEAGUE EXPLORE	Guided by adult Coaches and Core Values, teams design and build a Team Model based on the Challenge, using LEGO® Education WeDo 2.0 to program it to move. They illustrate their research and journey in a Show Me Poster, sharing what they learned.	Grades K - 4 Ages 6 - 10	August to April
FIRST LEGO LEAGUE CHALLENGE	Teams design their own solution to a real world problem and build autonomous LEGO® MINDSTORMS® or LEGO Education SPIKE™ Prime robots that perform a series of missions using exclusive LEGO models. The theme changes annually.	Grades 4 - 8 Ages 9 - 14	November to April
FIRST. TECH CHALLENGE	Teams design, build, and program their robots to compete in an Alliance format against other teams. Robots are built from a reusable platform, powered by Android technology, and programmed using Java or Blocks.	Grades 7 - 12 Ages 12 - 18	October to April
FIRST. ROBOTICS COMPETITION	Teams design and build a robot starting with a standard kit of parts and common set of rules to play a sophisticated field game that changes each season. Teams also define a "brand," hone teamwork skills, and develop community partnerships for	Grades 9 - 12 Ages 14 - 18	February to April



develop community partnerships for support.

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FIRST® Tech Challenge Highlights

Team Structure

- Teams consist of a maximum of 15 students, with 2-3 adult mentors per team.
- FIRST® Tech Challenge students are within grades 7 to 12 and ages from 12 to 18 years

Team Activities

• Team members engage in robot construction, engineering, programming, and event competition

Competitive Events

- 6,800 FIRST® Tech Challenge teams during the 2018-19 season, with 68,000 total participants representing 37 countries
- · The season consists of practice league meets and ranked tournaments
- The highest level of competition is the World Championship, held each year in April
- Volunteers have accumulated over 18 million volunteer hours between all levels since 1989
- Fast-paced competition that offers opportunities to connect with other robotics students from different backgrounds

The Game and Field

- Each new season, FIRST® releases a robot challenge for each of its levels
- The 2019-20 game for FIRST® Tech Challenge was Skystone
- The field is the main activity area for robot competition and is sized 12' x 12'
- Four robots from two alliances contend during a match

The Robot

- Maximum dimensions of 18" x 18" x 18" with a maximum weight of 42 lbs
- Must accomplish a variety of tasks to score points
- Robots are built from scratch using a modular kit of parts
- Powered by Android technology using industry-standard programming languages and machine learning capability
- Components include motors, servos, sensors, electronics, and aluminum extrusion





A computer-generated render, produced by Eagle Robotics members, of the robot used by Team 7373 in the 2020 Georgia State Championship.



The Awards

- Teams are eligible to earn one of seven different awards at tournaments or championship events. 2nd and 3rd place awards are also distributed.
- Awards, along with robot match performance, determine advancement to higher levels of competition

Inspire Award

Presented to the team that exemplifies the spirit of the FIRST® Tech Challenge

Think Award

Given to the team that best navigates the engineering design process

Connect Award

Awarded to the team that connected most to the local and engineering community

Rockwell Collins Innovate Award

Presented to the team with the most inventive design

Design Award

Awarded to the team that connected most to the local and engineering community

Motivate Award

Stands for outstanding team spirit and enthusiasm

Control Award, Presented by ARM, Inc.

Acknowledges the team that best utilizes sensors and software

Promote Award

Challenges teams to submit a high quality, 60-second PSA video based on an annual theme

Compass Award

Requires teams to submit a video nominating an exceptional coach or mentor

Winning Alliance Award

Earned by the alliance that wins the final elimination matches

Finalist Alliance Award

Acquired by the alliances in the final match of the entire competition



Finance Summary

"Eagle Robotics will become the nexus in which healthy competitive spirit and STEM education converge. Eagle Robotics seeks to become the model FIRST® program in Georgia, defined by competitive rigor and sustained excellence in leadership and engineering."

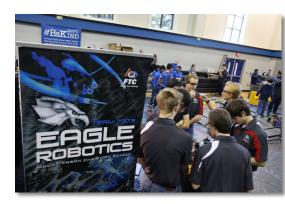
- Team Vision Statement

WHY SPONSOR US?

Eagle Robotics aspires to be the crossroads at which competitive spirit and STEM education meet. Not only do we aim to be a strong competitor, but it is our greater concern to work towards providing proper leadership and a connected learning environment to those within our reach.

For many years, we have gained experience in areas such as 3D printing and CAD modeling, robotics, working with real materials, interacting with companies in a professional manner, and leading with initiative and dependability.





These skills are constantly being taught to students by coaches, mentors, other students, and sponsors. Many students have been able to pursue engineering jobs and internships due to their experiences in this program. These opportunities to teach and learn are made possible through sponsors and donors of our program. By investing your time, knowledge, and/or finances, you are helping raise the next generation of STEM students that will change our world, and for that, we are most grateful.



Sponsorships

Sponsor tiers are based on the amount donated. Each tier receives unique benefits and also receives the benefits of the tier below it.

We strive to build ongoing, strong relationships with our sponsors, and we are grateful for their contributions. Our team welcomes interaction regarding any question, contribution, tour, or opportunity you might be able to provide (see p. 23 for contact information).

Platinum Sponsors

(\$1000+)

- Logo on robot
- Custom sponsor plaque
- All Gold Sponsor benefits

Gold Sponsors

(\$500 - \$999)

- Recognition on team print collateral
- All Silver Sponsor benefits

Silver Sponsors

(\$250 - \$499)

- Logo/name on themed t-shirt
- Recognition on team communication
- All Eagle Sponsor benefits

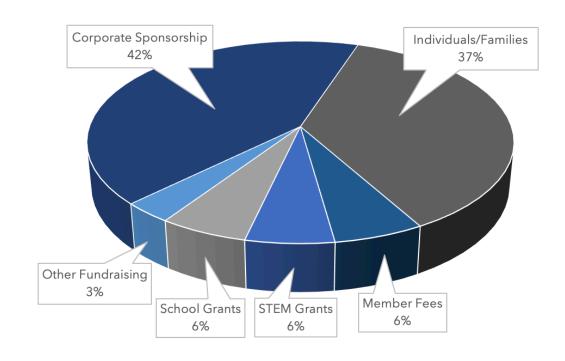
Eagle Sponsors

(\$1 - \$249)

• Recognition on team website

REVENUE STREAMS FROM 2019-20

The revenue streams of Eagle Robotics from the 2019-2020 season are depicted below.





EXPENDITURES FROM 2019-20 SEASON

These are the expenses from the 2019-20 FIRST® RISE season of Eagle Robotics.

Recorded Expenses 2019-20 Season

Expenditures	Cost
Events & Fees	\$1,850.00
Robot Parts, Robot Tools, & Equipment	\$9,357.77
Uniforms	\$1,670.82
Transportation	\$460.50
Tournament Hosting	\$4,830.26
Marketing	\$2,673.67
Engineering Notebooks	\$162.94
Outreach	\$539.61
Regular Season Total (Kickoff → State Championship)	\$21,545.57

PROJECTED BUDGET FOR 2020-21 SEASON

This budget is based on the previous season's expenditures and will cover the operation costs of two FIRST® Tech Challenge teams from the season start through state competition, accounting for robot parts, marketing, events, and more. If a team advances to the Houston World Championship, additional funding, separate from the budget items below, will be needed in order for them to compete.

A detailed breakdown of this projected budget is also available and can be requested from the team or the coaches.

Projected Evnenses 2020-21 Season

Expenditures	Cost
Events & Fees	\$1,850.00
Robot Parts	\$6,000.00
Technology & Control Systems	\$2,500.00
Tools, Maintenance & Field	\$1,700.00
Transportation	\$600.00
Tournament Hosting	\$5,000.00
Uniforms & Engineering Notebooks	\$1,300.00
Marketing	\$2,840.00
Outreach	\$550.00
Team Safety	\$550.00
World Championship*	\$19,000.00
Regular Season Total (Kickoff → State Championship)	\$22,890.00
Full Season Total (Kickoff → World Championship)	\$41,890.00

^{*}If a team advances to the Houston World Championship, additional funding will be needed (estimated \$19,000).



Media and Team Contact Info

MEDIA



Eagle Robotics Website: eaglerobotics.net



Eagle Robotics YouTube Channel: Eagle Robotics



FIRST® Website: firstinspires.org



Georgia FIRST® Robotics Website: gafirst.org

TEAM, COACH, AND MENTOR

Team Emails:

Team 7373: team7373robotics@gmail.com

Team 11364: team11364robotics@gmail.com

Brad Smith, Head Coach:

Email: bsmith@mtparanschool.com

John Quarles, Lead Engineering Mentor:

Email: jgquarles1957@gmail.com

Mount Paran Christian School

Mount Paran Christian School Attn: Brad Smith 1275 Stanley Road NW Kennesaw, GA 30152

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TEAM SPONSORS

2019-20 SEASON



















MARK AND NANCY PETERSON FOUNDATION
STEVE AND SHANNON MCCUNE
CHRIS AND TAMMIE HANSON
STEPHEN AND KELLY MOSS
WADE AND ANGELA TORP
JON AND EMILY HAYGOOD
MARK AND RANDI TERRY
DAN AND LISA SPINETTO
RICK AND TINA BAKER

