



BEST Robotics



2021 Competition



October 23, 2021
Trojan Arena

Troy University
Troy, AL

Welcome

TROY University's BEST Robotics Planning Committee, would like to welcome all students, teachers, coaches, mentors, parents, and sponsors to the 2021 TROY University BEST Robotics competition. The mission of BEST is to inspire students to pursue careers in science, technology, engineering, and mathematics through participation in a competitive robotics program that fosters knowledge, teamwork, and communication. Students learn to work through the engineering design process, develop strong communication skills, build effective leadership and teamwork abilities, understand the entrepreneurial process, and comprehend the global business environment.

The theme of this year's competition is "Demo Daze". Students are afforded the opportunity to design, build, and test robots to plan and perform the operations at a demolition site, including planning and executing a building demolition, construction security and safety measures at the site, clearing the site of trash and recapturing reusable and recyclable construction and demolition (C&D) materials resulting from the demolition activity.

TROY University BEST is excited to serve as a hub for 7 teams comprised of more than 127 middle and high school students.

On behalf of TROY University BEST Robotics, and with sincere gratitude, we extend a special thank you to all of our sponsors for making TROY University BEST Robotics possible.

Good luck teams!

----- ***TROY University BEST Robotics Planning Committee***



STATE OF ALABAMA

October 23, 2021

Greetings:

I would like to welcome you to the Wiregrass BEST Robotics Competition held in collaboration with TROY University BEST Robotics Competition on Saturday, October 23, 2021 at the Trojan Arena.

The State of Alabama is proud to host this exciting event and welcome you with true Southern hospitality. I would like to congratulate the teams who are competing at this year's competition. I encourage you to continue your education and to make service to the state and nation a priority in your life. You represent America's bright and shining future.

Upon completion of the event, many of you will return to your homes. I wish you a safe and pleasant journey.

Again, welcome to the TROY University BEST Robotics and the Wiregrass BEST Robotics Competition and best wishes for a memorable event.

Sincerely,

A handwritten signature in black ink that reads "Kay Ivey". The signature is written in a cursive, flowing style.

Kay Ivey
Governor

KI/pb/aw





Wiregrass BEST Robotics
BOOSTING ENGINEERING, SCIENCE, AND TECHNOLOGY
www.wiregrassbestinc.org

Welcome Parents, Teachers, Students, and Community Members:

On behalf of the Wiregrass BEST Robotics Board of Directors, we welcome all of you to our 2021 Game Day Demo Daze. We are excited to collaborate with TROY University BEST for another game season and are very happy to see what the students from both hubs can come up with. After being out for a year due to COVID, I am so excited to have you all back to attend and participate in this event in person.

Today is the day you will see the students' products and what they accomplished over the 56 days; they had to develop a robot that can function and complete the tasks at hand on the game field.

We invite you to enjoy this day and look at all the exhibit booths, talk with all the students, and see what they have learned from this experience. For any social media post, we ask you to use the hashtag #thanks2BESTRobotics, #DEMODOAZE2021, and #BESTRobotics2021.

Again, my board and I welcome you, and we hope you will enjoy your day here at the Trojan Arena.

Sincerely,

Stephen L. Tsukuda

Stephen L. Tsukuda
Executive Director
Hub Director

Game Day 2021



Saturday, October 23, 2021

8:00 AM – 10:00 AM	Registration – Trojan Arena Lobby
8:30 AM – 9:30 AM	Compliance Check-in – Pit/ Trojan Arena Floor
9:30 AM	Drivers/ Spotters/ Mentors Meeting - Pit/ Trojan Arena Floor
10:00 AM	Opening Ceremony <ul style="list-style-type: none">- Welcome- Pledge of Allegiance- National Anthem- Recognition of Sponsors- Parade of Robots
10:30 AM – 12:30 PM	Competition Matches Seeding Rounds [5 matches per team]
10:30 AM – 4:00 PM	Team Exhibits Fair – Trojan Arena Lobby
12:30 PM – 1:00 PM	Lunch Break
1:00 PM – 2:00 PM	Competition Matches Continue Seeding Rounds [5 matches per team]
2:00 PM – 2:30 PM	Competition Matches Wild Card Match [1 match] <i>Top 4 Project Engineering Notebook teams (not among the top robot performing teams.)</i>
2:30 – 4:00 PM	Competition Matches Semi-Final Rounds [3 matches per team]
4:00 PM – 4:15 PM	Break
4:00 PM	Team Exhibits may be dismantled
4:15 – 5:30 PM	Competition Matches Final Rounds [3 matches per team]
5:30 PM – 6:00 PM	Break
6:00 PM – 7:00 PM	Awards Ceremony



BEST Robotics

2021 Participating Teams BEST Award Competition

School	School System	Team Number
Abbeville High School Mentors: Ms. Tiffany Roy	Henry County	2251
CA3L (Pike County Schools Center for Advanced Academics and Accelerated Learning) Mentors: Ms. Kim Sellers	Pike County	2254
MACH – Mobile Area Coalition of Homeschoolers Mentors: Mr. Tyson Hoffman, Ms. Beth McPherson, & Ms. Stephanie Maples	Home School	2273
Straughn High School Mentors: Mr. Stephen Bowen & Ms. Elizabeth Wood	Covington County	2271



BEST Robotics

2021 Participating Teams Head-to-Head Competition

School	School System	Team Number
Carroll High School Mentors: Major Kristopher Christl	Ozark City	2261
Hillcrest High School Mentors: Dr. Karen Stewart	Conecuh County	2274
Thurgood Marshall Middle School Mentors: Ms. Patricia Radford	Conecuh County	2267



2021 Participating Teams BEST Award Competition




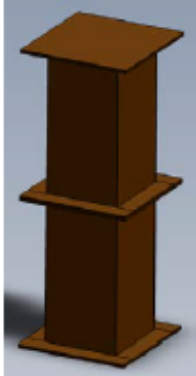
School	School System	Team Number
Ridgecrest Christian School	AISA	1353
Ashford High School	Houston County, AL	1355
Houston Academy	AISA	1354
Beulah Academy of Science	Escambia County, FL	1356
Faith Academy	AISA	1358
Beulah Middle	Escambia County, FL	1361



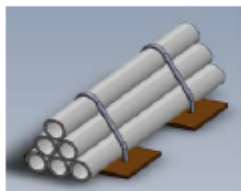

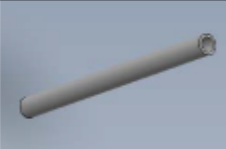



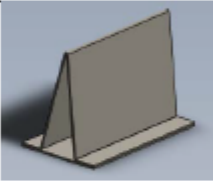
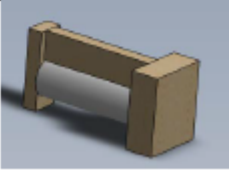
2021 Participating Teams Head-to-Head Competition

School	School System	Team Number
Seacoast Collegiate High School	Walton County, FL	1351
Early County High School	Early County, GA	1357
Spanish Fort High School	Baldwin County, AL	1359
Northwest Florida Robot Spot	Home School Group	1356

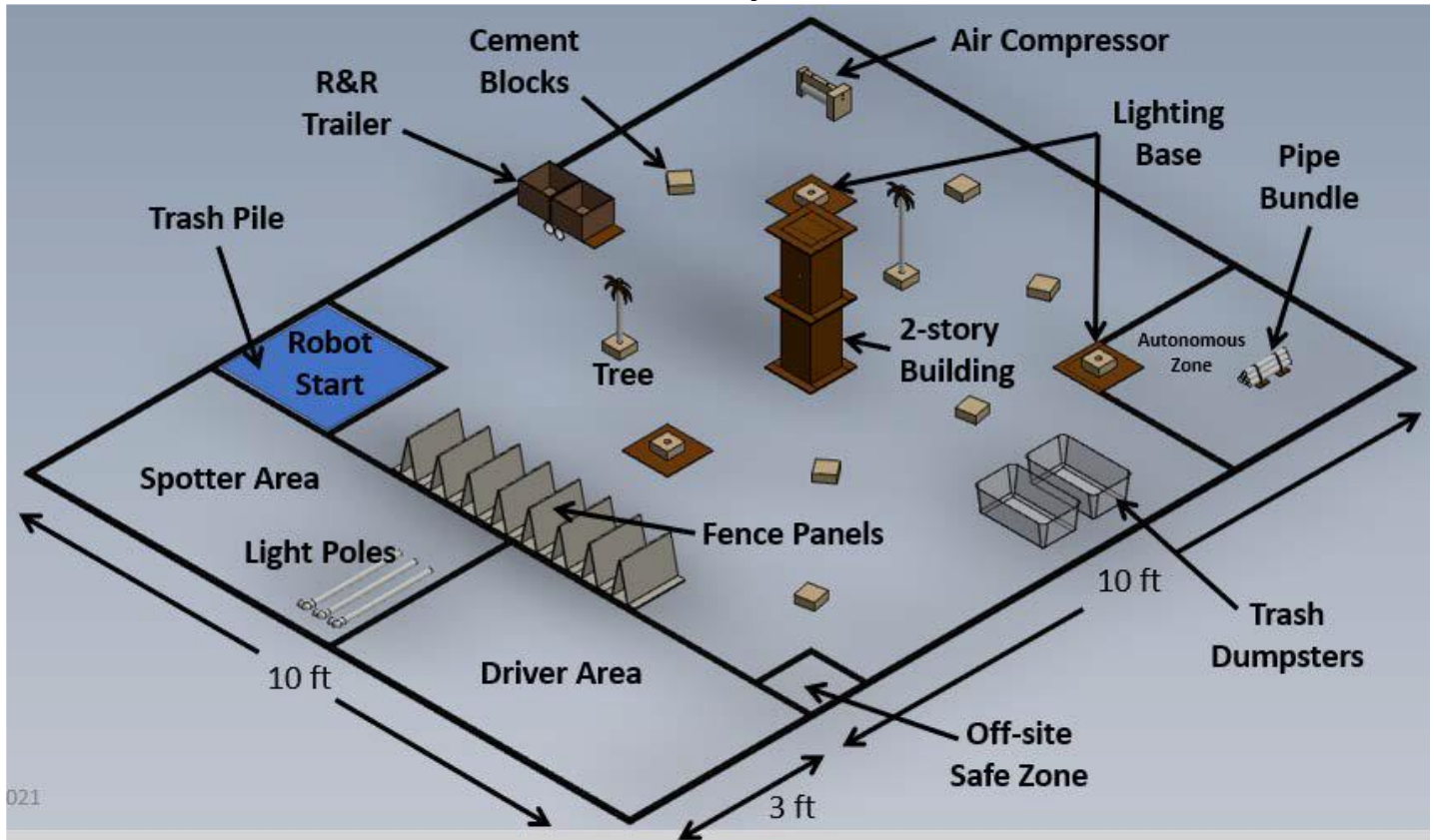
Game Pieces and Starting Locations

Material	Qty (per quad)	Starting Location	Photo
TRASH			
Cement block 3.5" x 3.5" x 1.5" Wood Block	6	Site Grounds	
Building Insulation, Cotton balls (1" size)	6	Inside Building	
Scrap Container, Solo Cup 16oz Note: the scrap containers are worthless and have no impact to the final score. They are only present to simplify transport of other materials.	2	Inside Building	
Building walls/floors/roof, various sizes, Masonite & 1x4	11 8 walls 2 floors 1 roof	Inside Building	

RE-USABLE			
Scrap Metal, 3/8" Nuts 0.24 oz each	25	Inside Building, Inside Scrap Container	
Scrap Tile, 4-part mesh tile, 2" hexagonal, 6.25" L x 4" W 4.13 oz each	3	Inside Building, Inside Scrap Container	
Pipe bundle, Six 1/2" x 8" pvc pipes, Arranged in triangle bundle 11.40 oz	1	Site Grounds	
RECYCLABLE			
Copper Wire Segments, 6" Romex, 14-2, straight 0.85 oz each	6	Inside Building, 3 on each level	
Water Pipe, 1/2" PVC pipe x 4", straight 0.85 oz each	8	Inside Building, 4 on each level	

SECURITY AND SAFETY EQUIPMENT			
Light Poles, ½" PVC, ~18" Long	3	Spotter Area	
Fence Panels, Cardboard 6" W x 10" L x 7" H.	8	Site Grounds	
VALUABLE CONSTRUCTION EQUIPMENT			
Air Compressor, Wood & PVC, ~ 3.5" W x 8.25" L x 4" H	1	Site Grounds	

Field Layout



021

How to Score Points

Perform operations at a demolition site:

- Plan and execute a building demolition.
- Plan and execute construction security and safety measures at the site
- Clear the site of trash.
- Recapture and recyclable construction and demolition (C&D) materials.

Game Piece	End of Match Location (Points Each)				Max # Possible Per Team	Max Possible Points Per Team ³
	Trash Pile	Dumpster	R&R Container	Trailer		
Trash						
Cement Block	2	5			6	30
Insulation	3	10			6	60
Building Wall	7	15			8	120
Building Floor/Roof	15	30			3	90
Reusable Materials ¹						
Scrap Metal	1	2	4		25	100
Scrap Tile	5	10	40		3	120
Pipe Bundle ²		50		100	1	100

Recyclable Materials ¹						
Copper Wire	4	7	20		6	120
Water Pipe	3	4	13		8	104

Game Piece	Points Per Connection ⁴	Points Per Installation	Max # Possible Per Team	Max Possible Pts Per Team
Fence Panel Connection ⁵	10		7	70
Installed Light Pole		75	3	225

Game Piece	Safe	Lifted	Secured	Max # Possible Per Team	Max Possible Pts Per Team
Air Compressor State	20	40	60	1	60

Task Completed	Points for a Successful Retrieval	Max # Possible Per Team	Max Possible Pts Per Team
Pipe Bundle Autonomous Retrieval	120	1	120

Bonuses

- A Trailer Balancing bonus is awarded for eligible game pieces supported by the trailer when the Flat Bed Trailer load is balanced at the end of the match. The trailer bed must not be touching the floor and both wheels must be touching the floor.
- The Trailer Balancing Bonus will double the points received for eligible game pieces in scoring position on the trailer (i.e., pipe bundle or items within R&R containers).
- An Autonomous Retrieval Bonus is awarded when the Pipe Bundle has been retrieved autonomously and it is successfully loaded onto the trailer.
- The Autonomous Retrieval Bonus will double the points received for successfully loading the pipe bundle on the trailer, independent of Trailer Balancing.
- The Closed Polygon Fencing Bonus is awarded when a valid closed polygon barrier surrounding the trailer is constructed.
- The Closed Polygon Fencing Bonus will double the points received for each fence panel connection in a valid closed polygon barrier surrounding the trailer.

Penalties

3.8.3.1 Disturbing Trees

- a. A tree falling, knocking a tree over, or moving the tree such that the 1" square tape pattern underneath its base is fully exposed, will result in a [20-second penalty](#) being assessed for each occurrence.
- b. When a tree falls or is disturbed, it is considered uprooted and may not be moved back into its original starting position.
- c. Only one [20-second penalty](#) will be assessed per tree that is disturbed. A maximum of 40 sec of penalty can therefore be assessed in one match if both trees are disturbed.

3.8.4 Score Nullifications

3.8.4.1 Disturbing Light Installation Platforms

- a. If a light installation platform is moved such that the 9" x 9" square tape pattern covered by the platform becomes fully exposed, the platform is considered disturbed and will not be awarded points for a light pole installed into it.
- b. Once disturbed, the platform is no longer a scoring opportunity for the duration of the match.
- c. A disturbed light installation platform may not be moved back into a valid scoring position.

3.8.4.2 Disturbing the Trailer

- a. If the trailer is moved such that the tape line underneath becomes fully exposed when viewed from a top-view, the trailer is considered disturbed.
- b. Once disturbed, the trailer is no longer a scoring opportunity for the duration of the match.
- c. A disturbed trailer may not be moved back into a valid scoring position.
- d. Material placed under the trailer is also considered to be disturbing the trailer.

3.8.4.3 Disturbing a Dumpster

- a. If a dumpster is moved such that the tape line underneath becomes fully exposed, the dumpster is considered disturbed.
- e. Once disturbed, a dumpster is no longer a scoring opportunity for the duration of the match.
- f. A disturbed dumpster may not be moved back into a valid scoring position.

3.8.5 Scoring Definitions

Disturbed – moved beyond the allowed amount.

Resting – touching such that the entire weight of the object is supported by what it rests on.

Inside, In, Within – within the imaginary infinite vertical planes defined by the innermost sides of a container/area or the outer edge of a tape line defining the boundaries of an area or grid space.

Thank you to all of the generous sponsors of TROY University BEST Robotics



BEST Robotics

Gold Sponsors [\$2,500.00 - \$4,999.00]

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BEST Friend Sponsors [< \$500.00]

Brannon Golden Trucking, LLC	Troy, AL
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CONGRATULATIONS ON YOUR SUCCESS

ROBOTICS

BEST



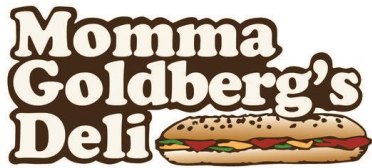
Southeast Gas

May the **EXCITEMENT** of the day **THRILL** you.
May the **CHALLENGE** of the project **GROW** you.
May the **SUPPORT** of your community **INSPIRE** you.

**Best wishes as you continue your
successful path!**



Thank you to all of our sponsors and supporters of TROY University BEST Robotics!



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BEST Robotics

Planning Committee

Name	Affiliation	Committee
Mrs. Faye Allen	Program Coordinator, Southeast Alabama Regional Inservice Center	Game Field Assembly
	College of Education	Hub Logistics/ Awards
Dr. Robin Bynum	Executive Director of Educational Outreach TROY University BEST Robotics, Hub Director	Hub Logistics/ Awards
	Professor, College of Education	Volunteers/ Judging
Dr. Shannon Dadd	Assistant Professor	Volunteers/ Judging
	College of Education	
Dr. Hyung Jae (Chris) Chang	Associate Professor	Volunteers/ Judging
	Computer Science College of Arts and Sciences	Software Support
Mr. Tom Dreilinger	Director, eLearning Alabama	Volunteers/ Judging
	College of Education	Software Support
Dr. Shirley Farrell	Associate Professor	Volunteers/ Judging
	College of Education	
Dr. Fred Figliano	Associate Dean	Volunteers/ Judging
	College of Education	
Mrs. Margaret Folmar	Program Development Consultant	Hub Logistics/ Awards
	Southeast Alabama Regional Inservice Center College of Education	Recruitment of Teams
Dr Byungkwan Jung	Assistant Professor	Software Support
	Department of Computer Science College of Arts and Sciences	
Dr. Long Ma	Assistant Professor	Kit Assembly/ Software Support
	Department of Computer Science College of Arts and Sciences	
Ms. Jennifer McLeod	Departmental Secretary, Southeast Alabama Regional Inservice Center	Hub Logistics/ Awards
	College of Education	Kit Assembly/ Software Support
Mrs. Jessica Moran	Instructor, Troy City Schools	Game Field Assembly
	College of Education	
Dr. Charisse Snell	Alabama Technology in Motion Specialist, Troy University	Judging
	College of Education	Software Support

Good luck to all teams!

**Thank you to all of the generous
sponsors of**

Wiregrass BEST Robotics



Mike Schmitz





Board of Directors

Stephen Tsukuda - Hub Director

Brittany Stewart - Patton

Doug Hicks

Michael Cox

Greg Cumbie

Yon Smith

Tanner Fuller

Glenn Waterworth

Melissa Lewis

