

ROBOJACKETS

COMPETITIVE ROBOTICS AT GEORGIA TECH

General Interest





ROBOJACKETS

COMPETITIVE ROBOTICS AT GEORGIA TECH

Outline

Introduction to RoboJackets

Team Introductions

- BattleBots
- RoboNav
- RoboCup
- RoboRacing
- RoboWrestling

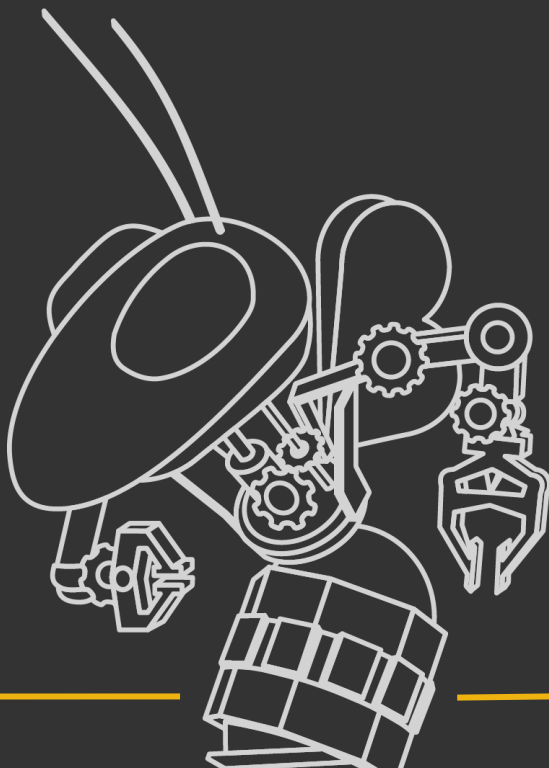
Outreach

Behind The Scenes

Training

How to Join

Networking + Pizza!



Our mission is to
**promote,
educate,
and advance**
the field of robotics.



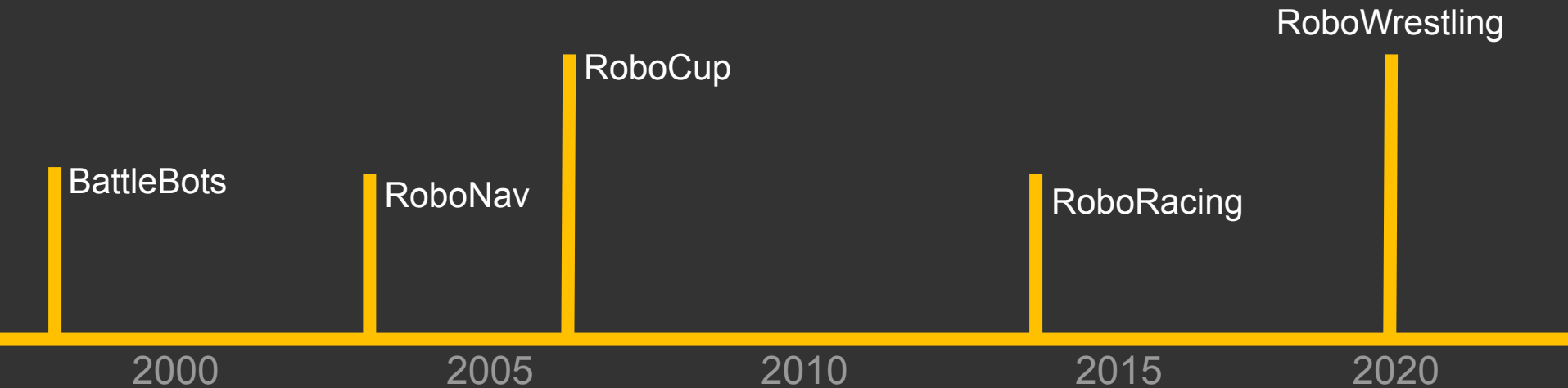
Learn by doing



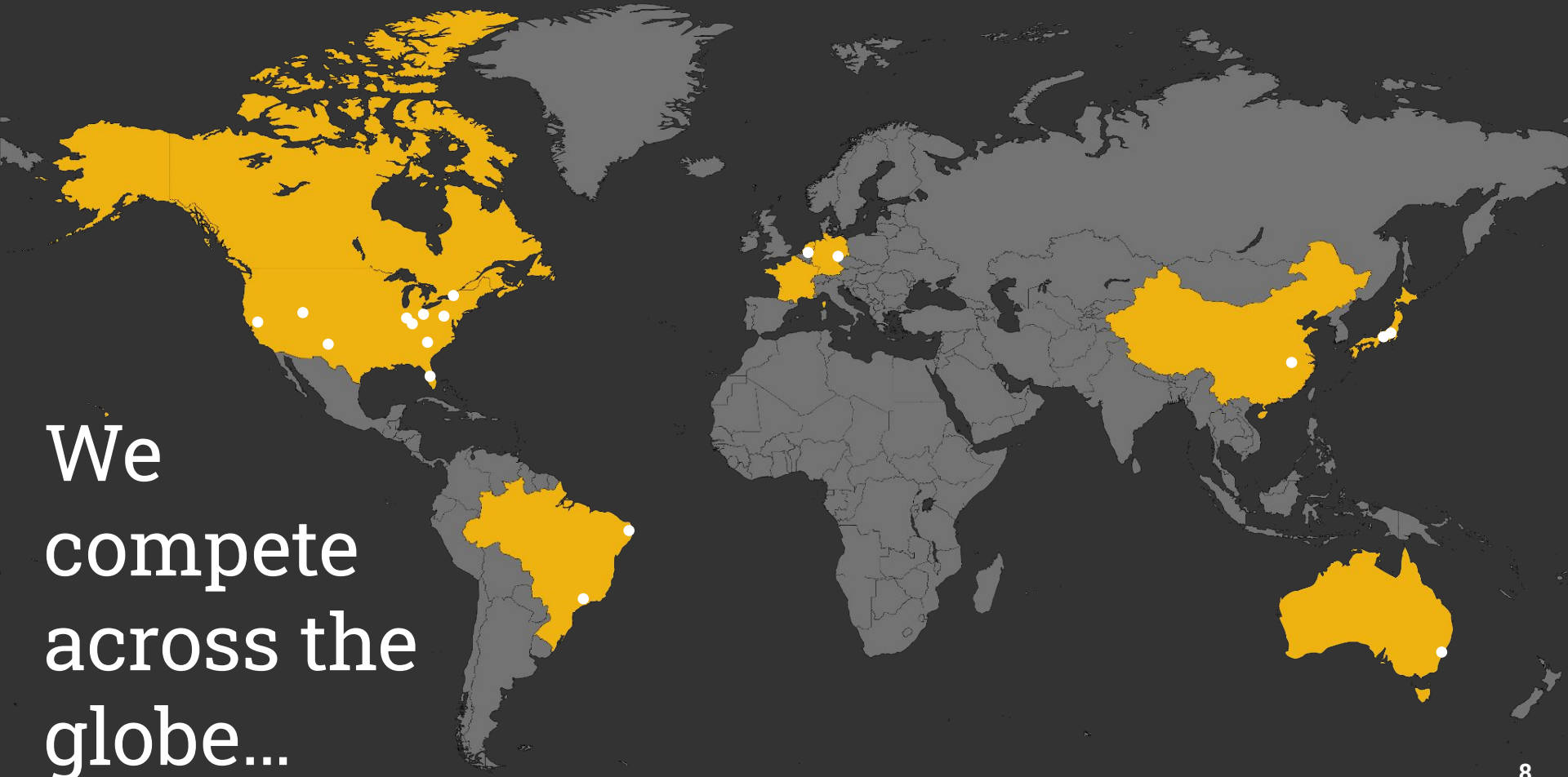
Mentorship



Timeline



We
compete
across the
globe...

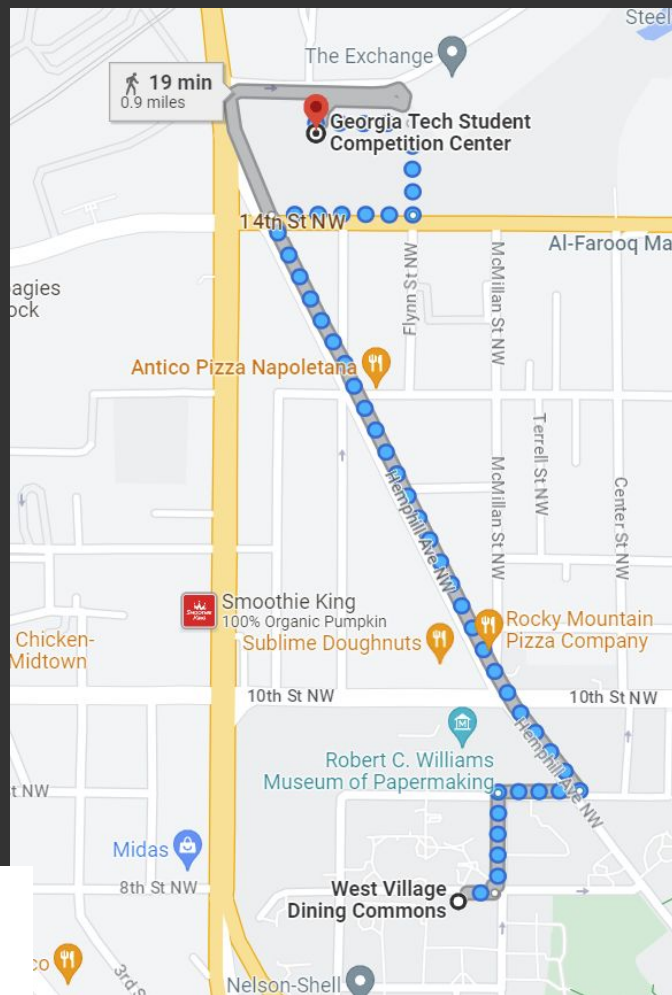


Where do we meet?



Green

Green 1: 6:45am-7:00pm
Green 2: 8:15am-7:00pm



RoboJackets in Industry



RoboJackets Founders



courseoff



essess

SkyMul



RoboJackets in Academia



Carnegie
Mellon
University

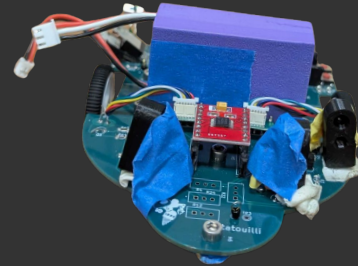
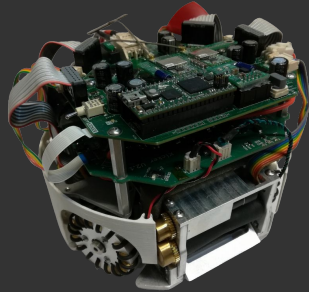
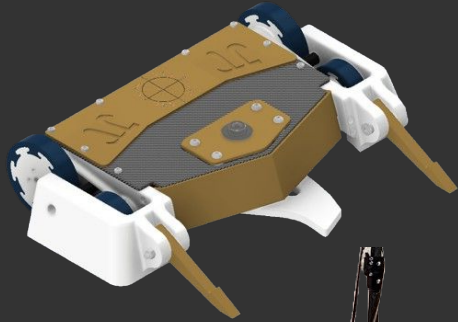


THE UNIVERSITY OF
CHICAGO

W
UNIVERSITY of
WASHINGTON



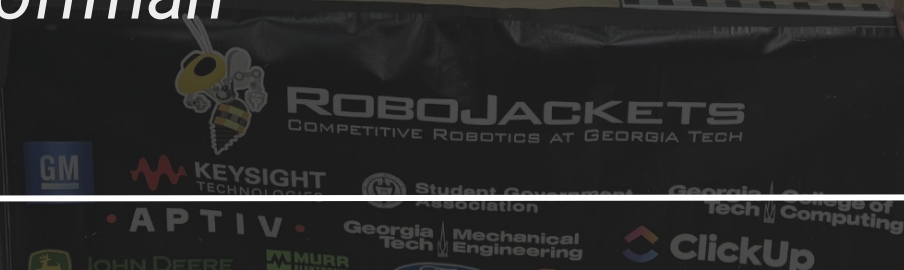
This Year



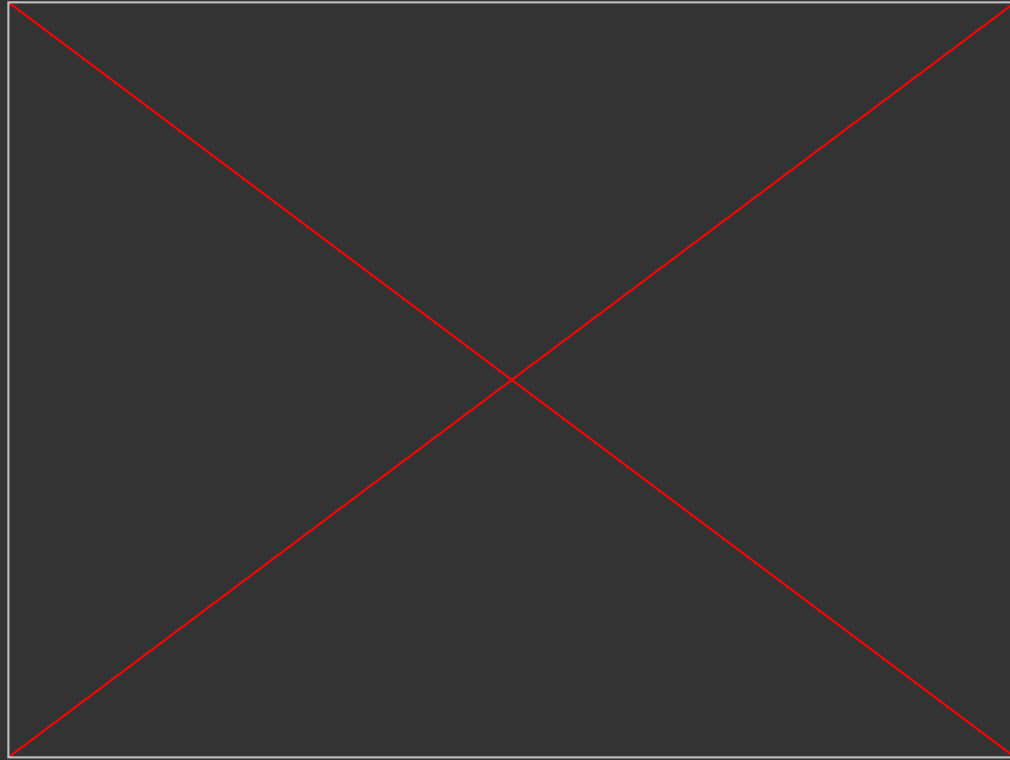


Battlebots

William Hoffman

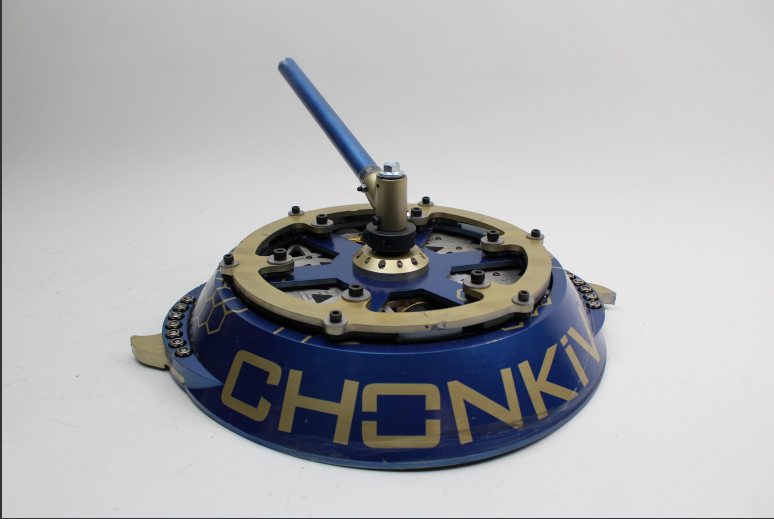


What is Battlebots?



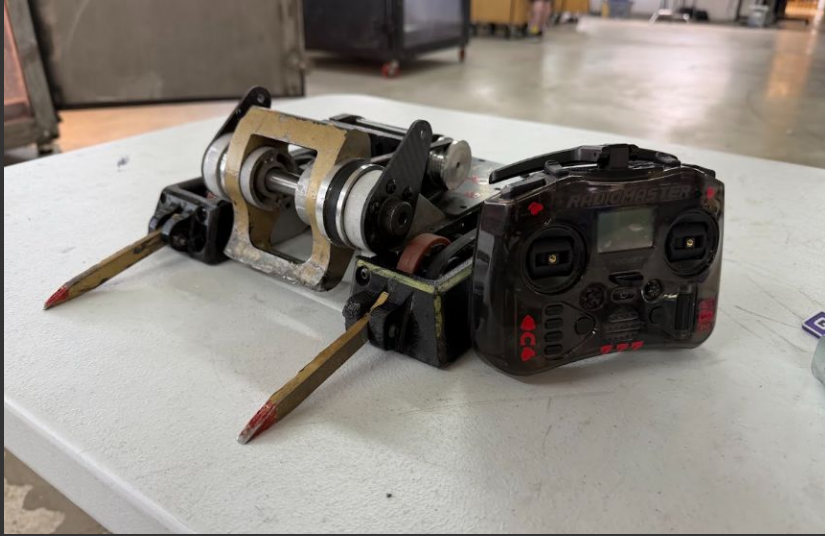
Our 30lb Veteran Battlebots

Chonkiv



Anxietii

Our 12lb Veteran Battlebots



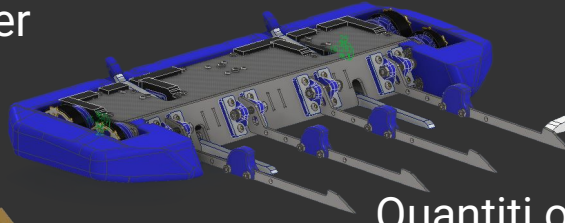
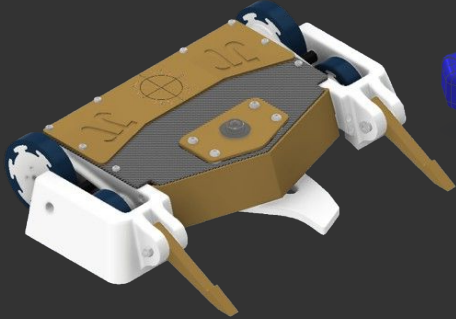
Lotteri



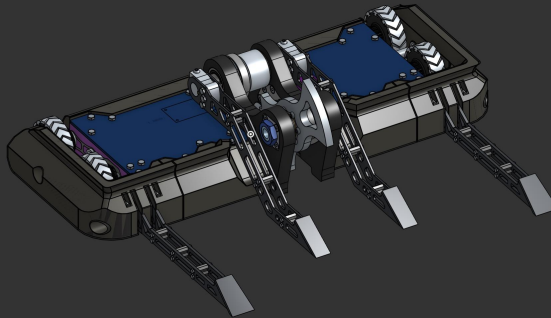
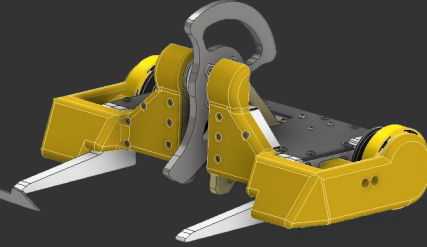
Cherri

Our New Battlebots

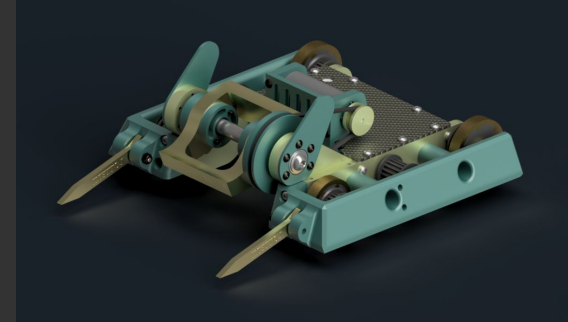
Pi
12lb Horizontal Spinner



Quantiti over Qualiti
30lb Multibot

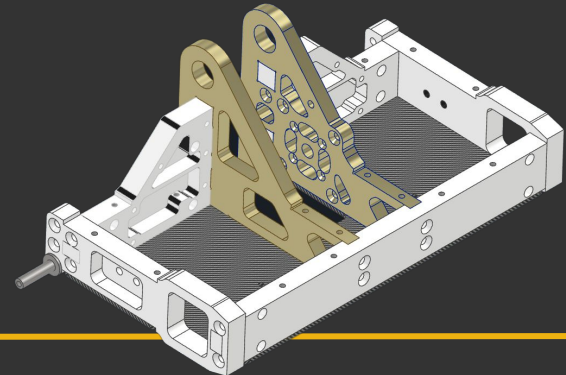
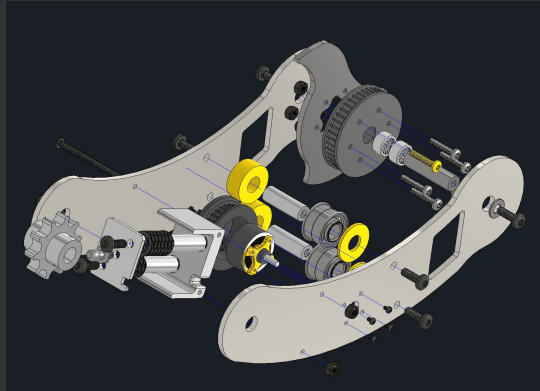
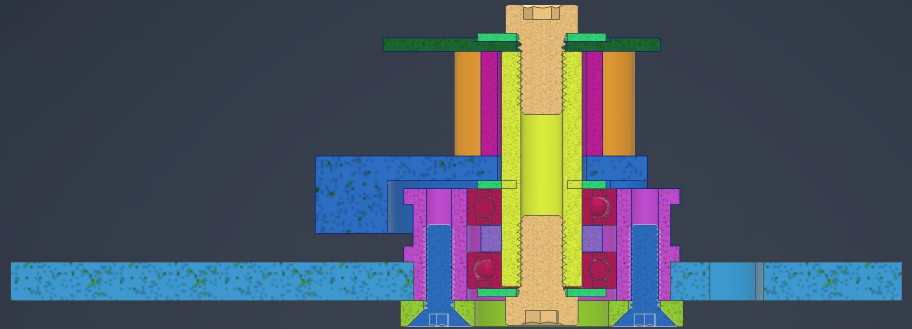
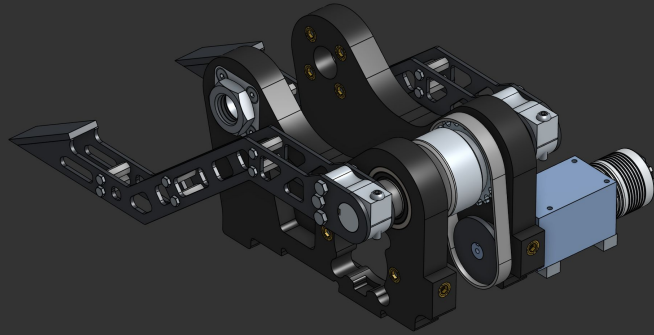


Graffiti
30lb Flipper Vert



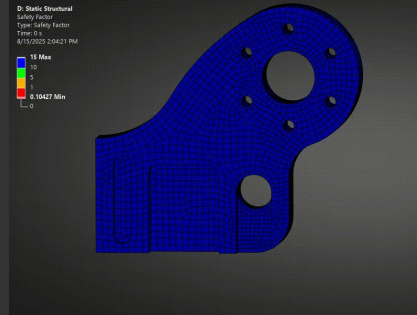
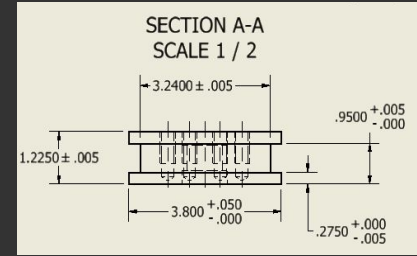
Lotterii
12lb Modular
Hammersaw/Beater Bar

CAD Modeled Sub-Systems



Skills You Can Learn

- Engineering Design
 - CAD
 - DFM/DFA
 - Finite Element Analysis
 - Failure Mode Analysis
- Part Drawings
- Prototyping/Machining
- Fundamental Electronics
- Dynamic Simulation
- Research/Experimentation

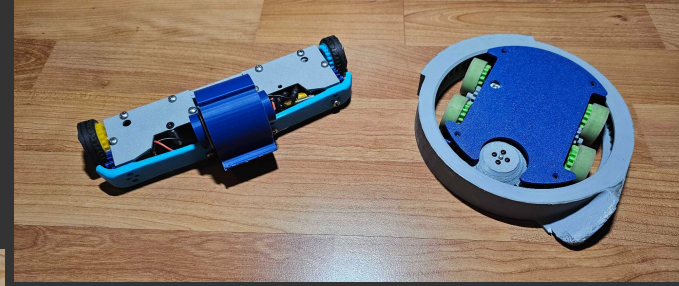
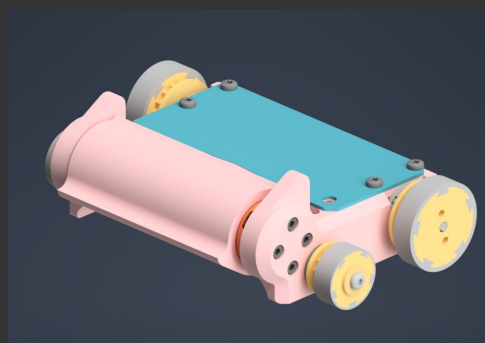
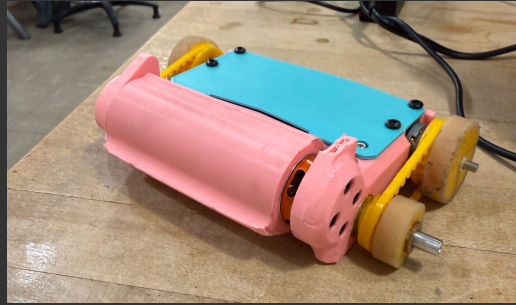


Competitions



Plant Combat Program

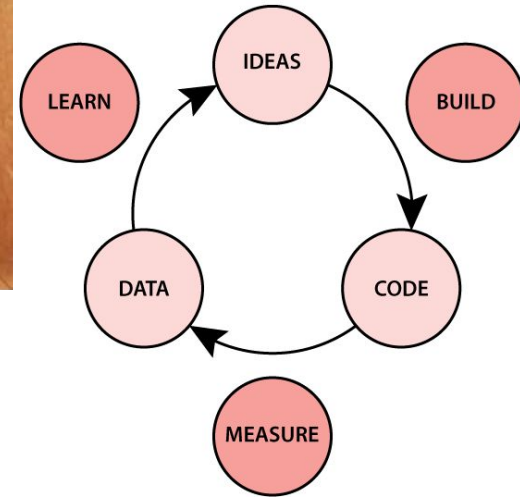
- Design, build, and compete a Plastic Antweight (1lb) bot over the course of 1 Semester
- Mentored by current members





Our Structure

NO EXPERIENCE
NECESSARY



Meeting Times

When do we meet?

Tuesday (New Members Only), Thursday OR Friday,
7:00 - 9:00 PM @ Student Competition Center

BattleBots Interest Meetings:

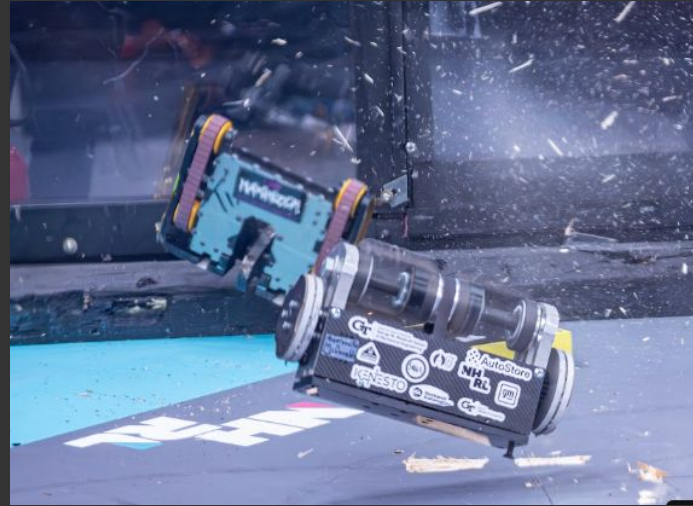
Monday, Sept. 14, 6:00 - 8:00 PM @ Skiles 255

Tuesday, Sept. 15, 6:00 - 8:00 PM @ Skiles 269

First New Member Meetings:

Tuesday Sept. 22, Thursday, Sept. 24 OR Friday,
Sept. 25

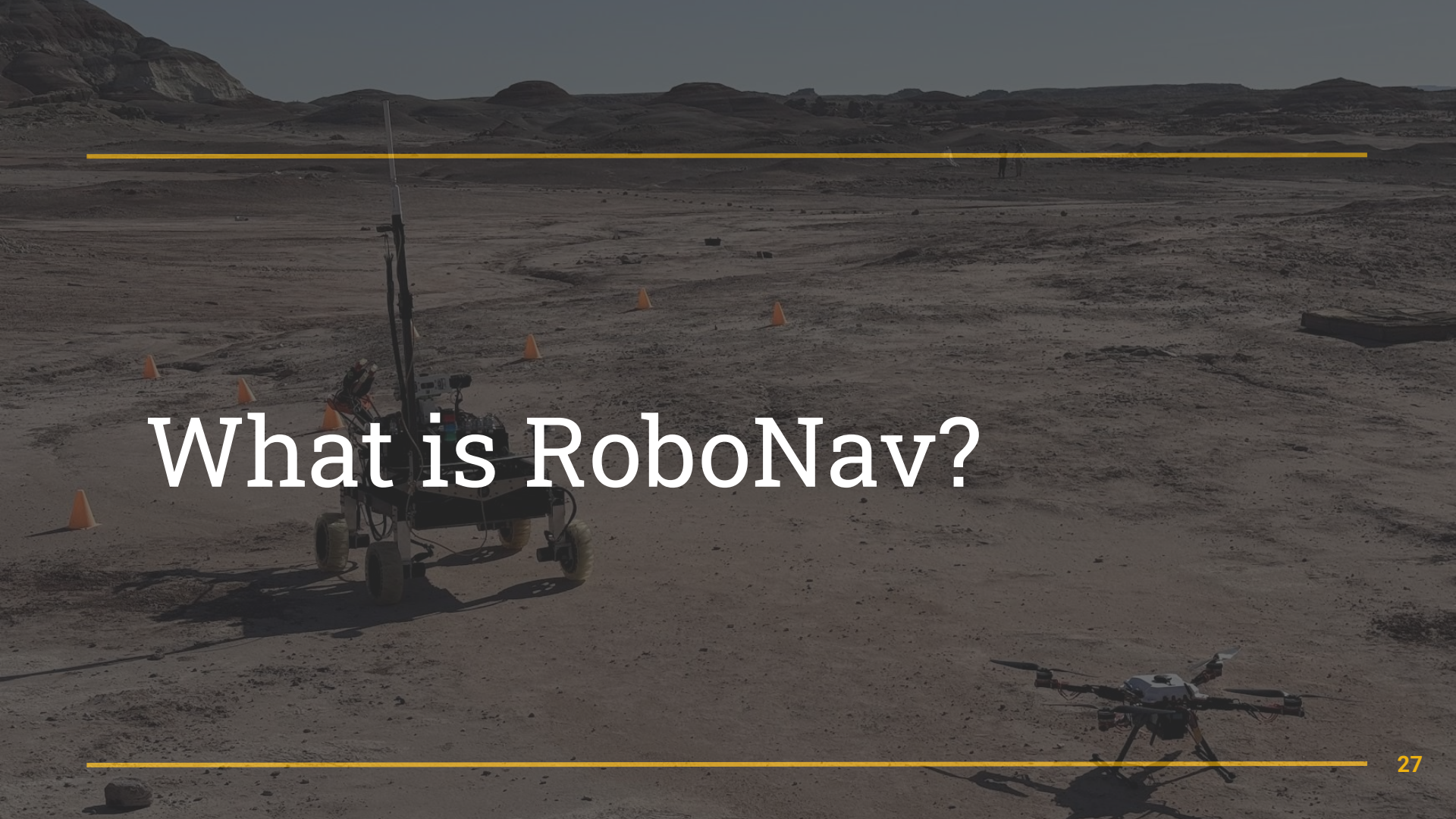
7:00 - 9:00 PM @ Student Competition Center





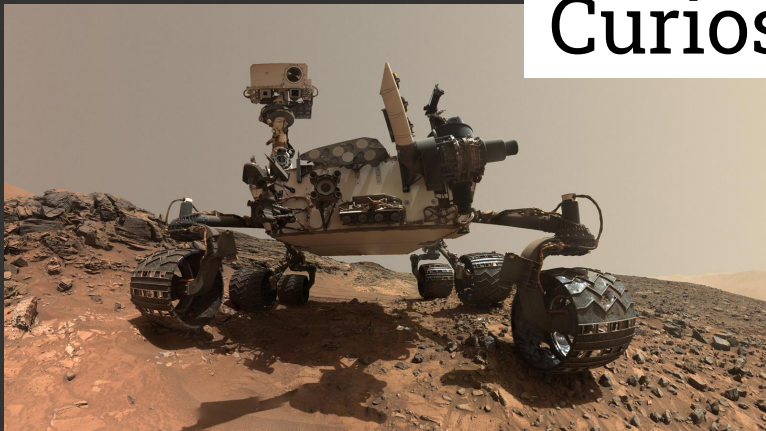
RoboNav

Viti Chandra

A wide-angle photograph of a desert landscape under a clear sky. In the foreground, a four-wheeled rover with a tall mast is positioned on the left. To its right, a quadcopter drone is on the ground. Several orange traffic cones are scattered across the sandy terrain. In the background, there are rolling sand dunes and a few small figures of people. A horizontal yellow line runs across the upper portion of the image.

What is RoboNav?

Curiosity (2011)



Perseverance (2020)



Spirit & Opportunity (2004)

University Rover Challenge





Feb-2024

Walli



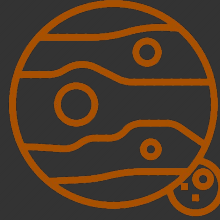
Arm Configuration



Science Configuration



Autonomous
Navigation



Equipment
Servicing

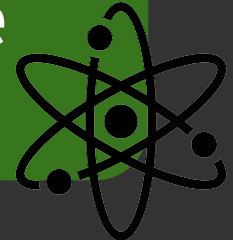


4 Missions

Extreme
Delivery



Science



Five Subteams



Mechanical



Electrical



Software

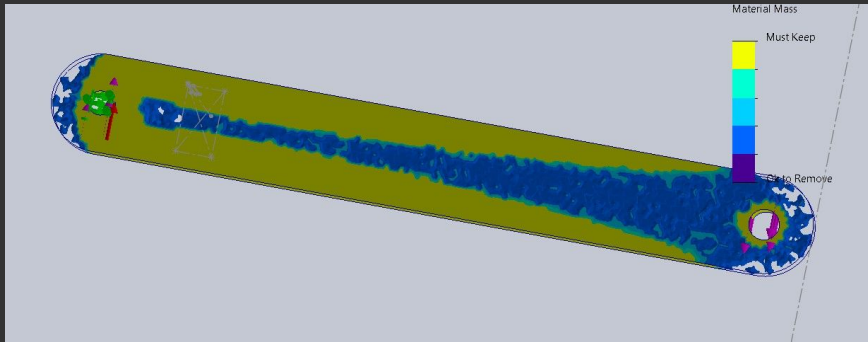
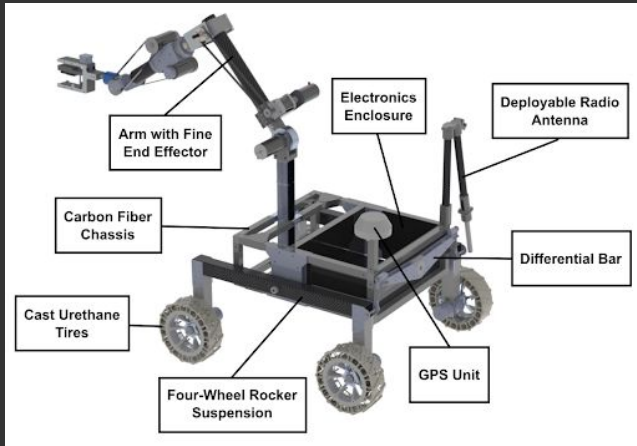


Science

Drone

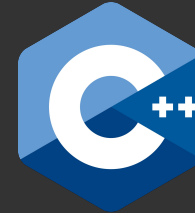
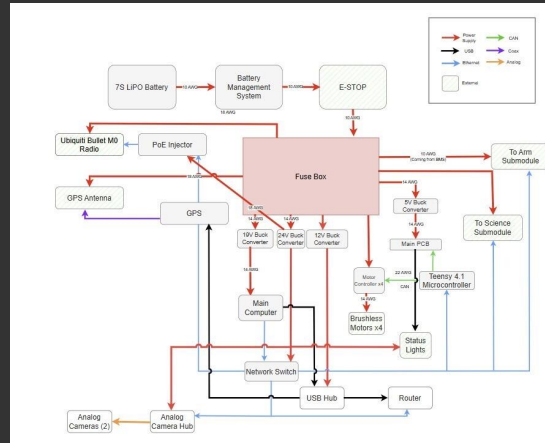
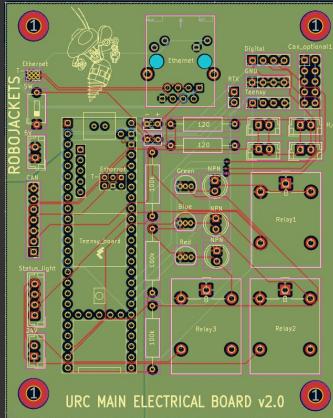
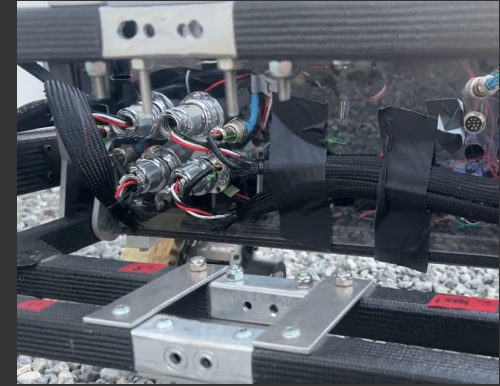
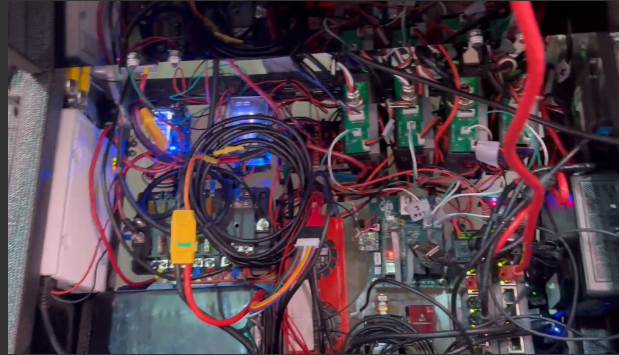
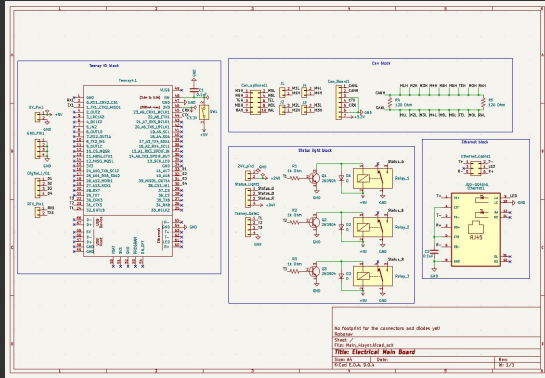


Mechanical



SOLIDWORKS

Electrical

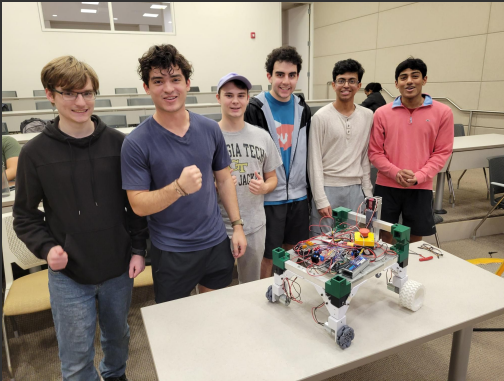


Altium

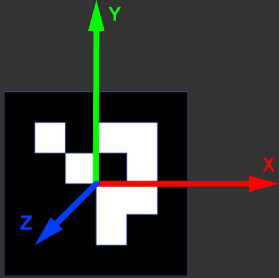


New Member Training

- **Mechanical + Electrical**
- **New Member Training**
 - Split into teams of ~6-8
 - Mechanical: design and manufacture a part for the rover
 - Electrical: Hands-on workshops + mini rover electrical assembly

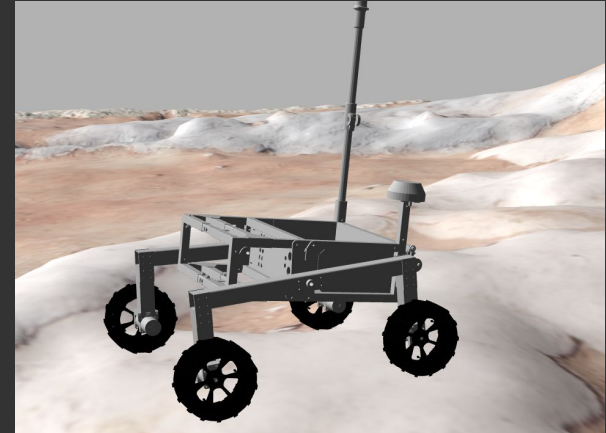
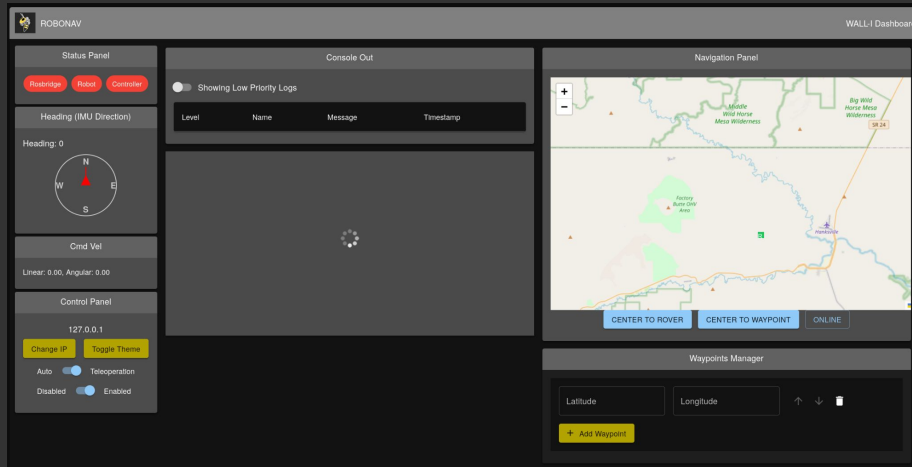


Software



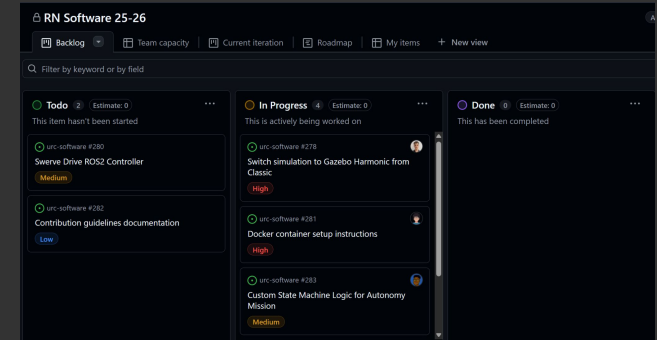
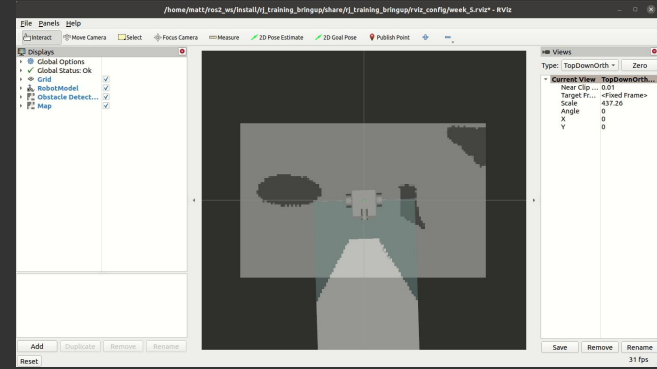
ROS 2

GAZEBO

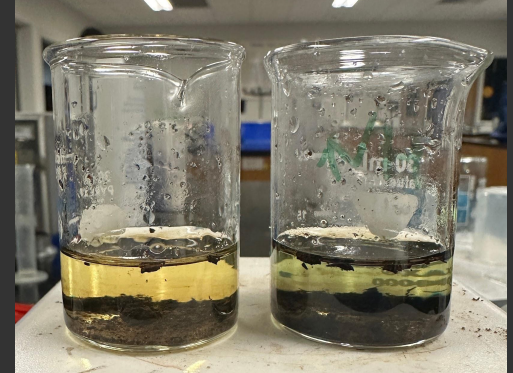
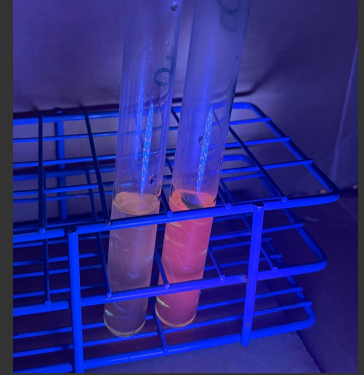
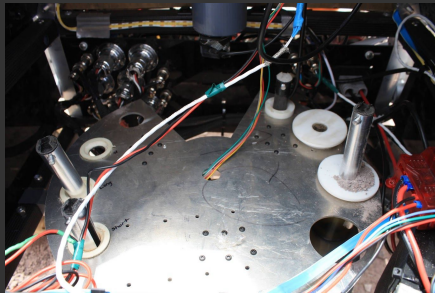
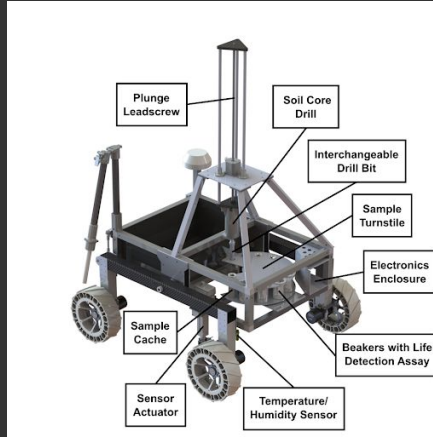


Software Subteams/Projects!

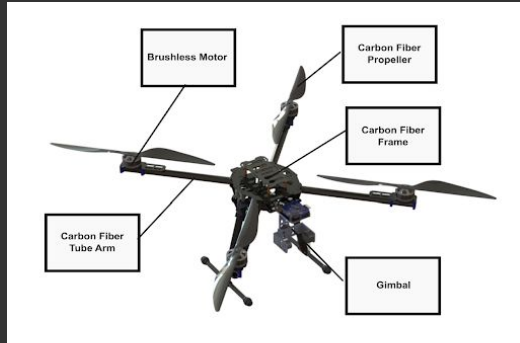
- **Specific Training Curriculum**
 - C++, ROS2, Robotics Fundamentals
 - University Rover Challenge and Software System Overviews
 - Weekly projects involving robotics algorithms and simulation
- **Projects Divided into Software Groups**
 - Autonomous Navigation
 - Drivetrain controls
 - Arm control
 - Teleoperation/Communications



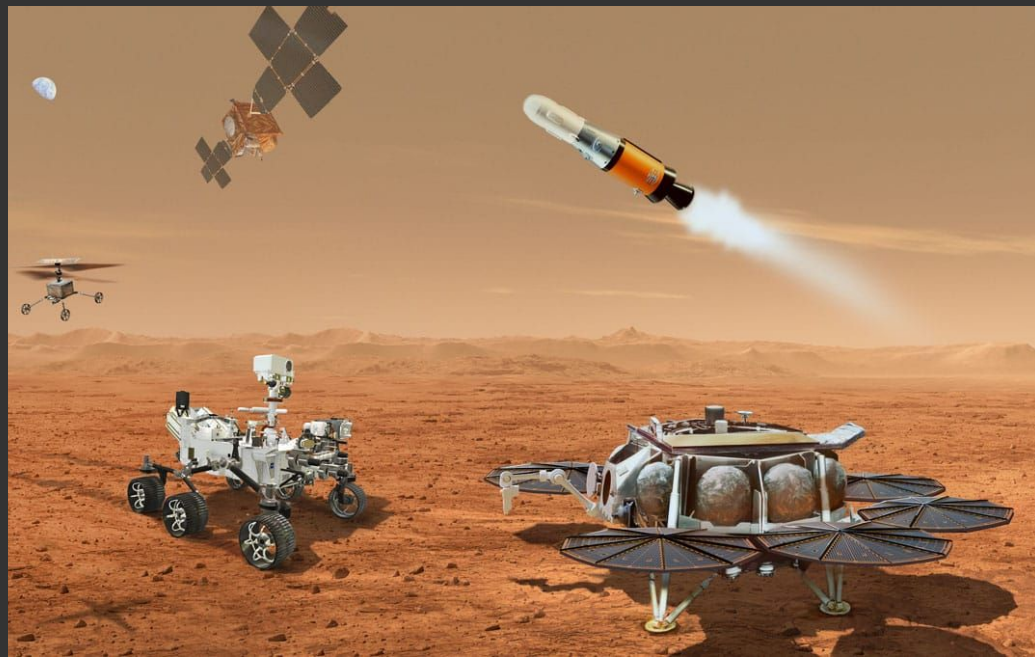
Science



Drone



Why RoboNav



Meetings

- **When do we meet?**
 - *All members* → Sundays: 4-7 PM @ SCC
 - Mech/Elec/Sci/Drone → Wednesdays: 6:30-9 PM @ SCC
 - Software: → Fridays 4-7 PM @ Klaus 2447
- **First New Member Meetings:**
 - Tuesday, 9/15: 6:30-8:30 PM @ MoSE G011 Classroom
 - Wednesday, 9/16: 6-8 PM @ Skiles 271 & 255

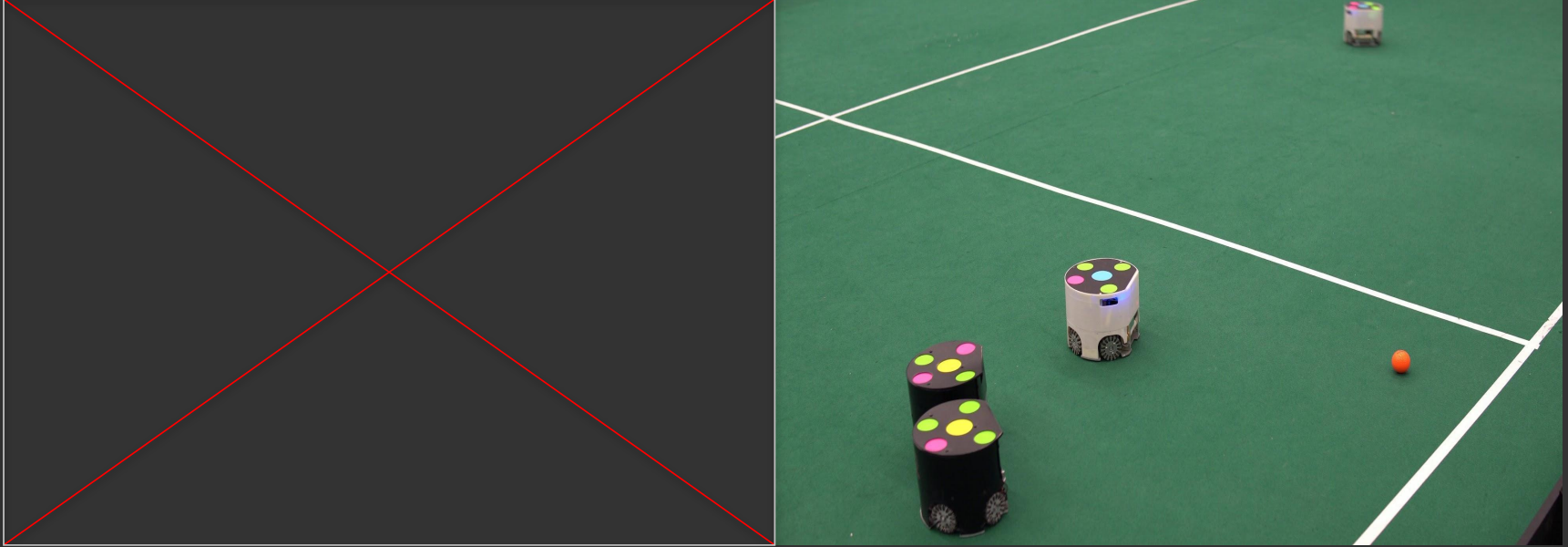




RoboCup

Swathi Padmanabhan

We play soccer!



Multi-Agent Autonomous Robotics

RoboCup Federation



📍 Salvador, Brazil (2025)



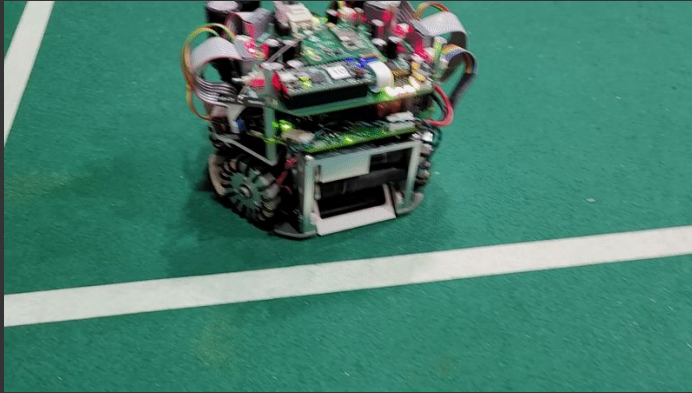
Incheon, South Korea (2026)



Peachtree Open (2026)

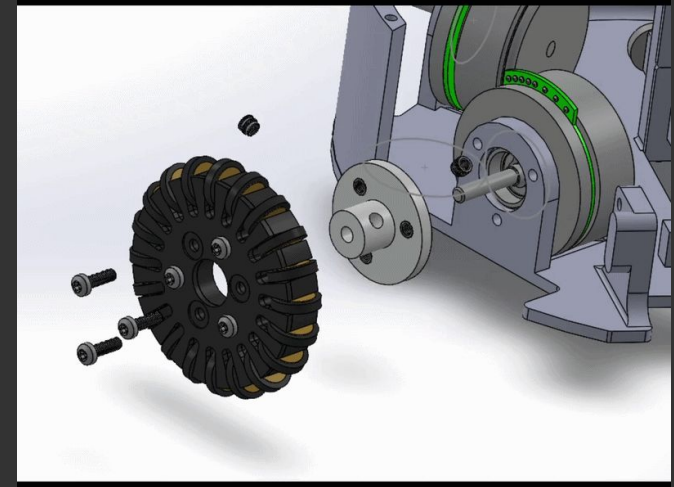
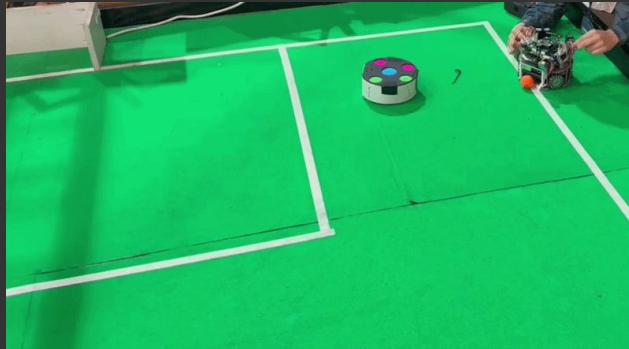
1st in the US, 5th in the World!

Mechatronics



<= Dribbler

Chipper =>



^

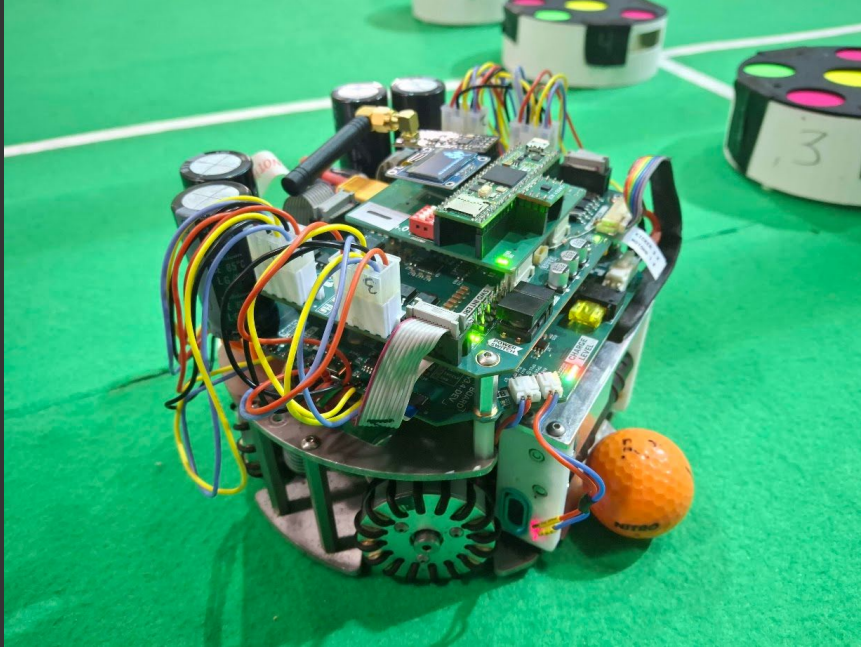
Direct Drive Motor
Assembly Design

Mechatronics

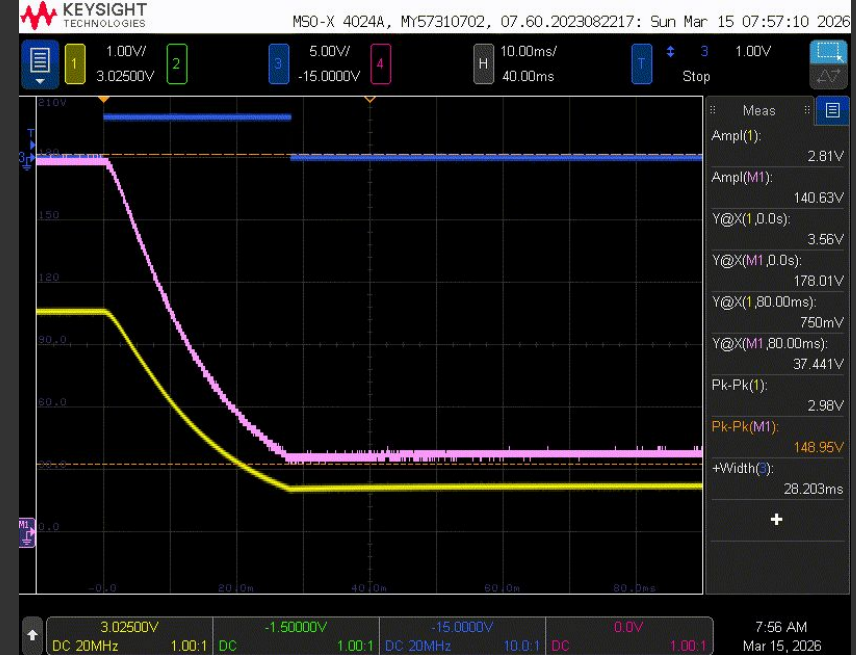
- CAD and Manufacturing
- 3D Printing, Machining, Forged Carbon Fiber
- Consistency Testing, Simulation, Modeling, & Controls Design + Analysis
- Working under space constraints
- Design philosophy in line with interviews
- End-to-end ownership



Electrical

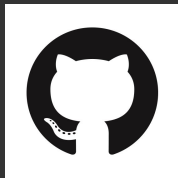


100% Custom PCB Stack

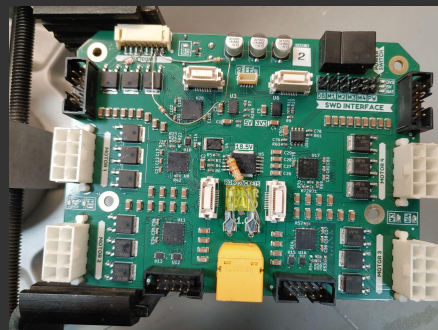


Kicker High Voltage Testing

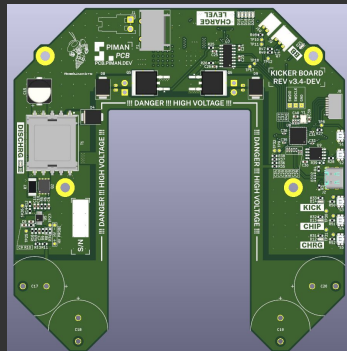
Electrical



- Circuit and PCB Design (KiCad)
- Complex boards, Manufactured at scale
- PCB Assembly, Testing, & Verification
- Collaborative Work through GitHub
- High Voltage, High Capacitance Designs
 - 250V, 4000uF!!
- Digital and Analog Designs
- Custom BLDC Motor Drivers
- Major EE stack redesign for more bots



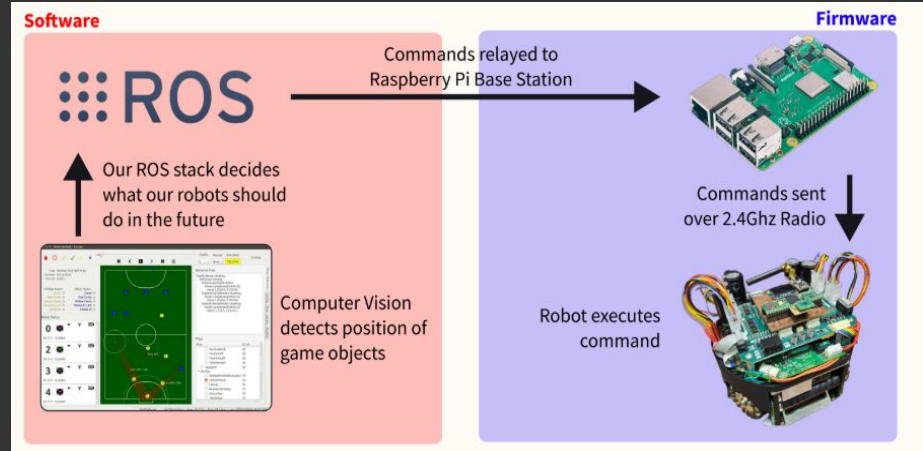
unified motor board v1.0



kicker board v3.4

Firmware

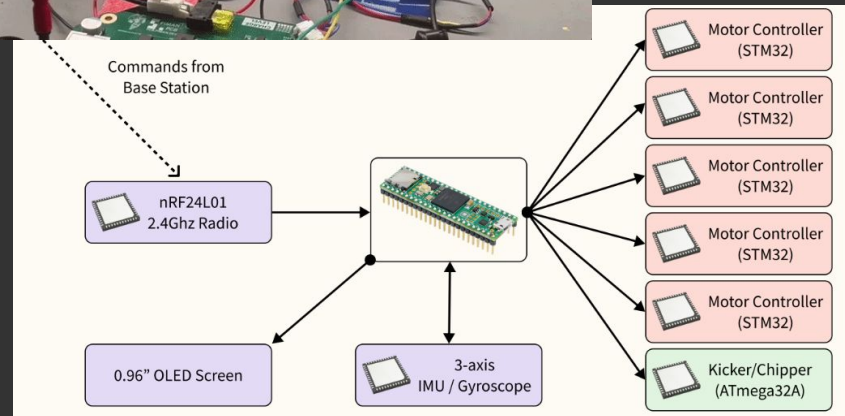
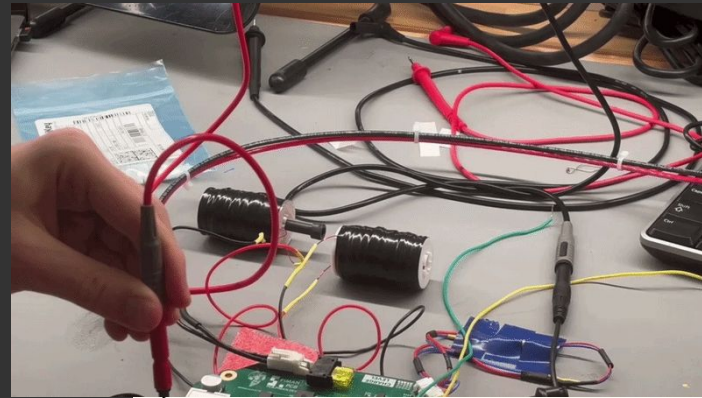
- Real-time firmware using C++ / Rust
- Bridge High-level software with Low-level electrical
- Motor Control and Sensor Fusion
- Low-Latency embedded software



Firmware

Tasks:

- Writing FW for new boards
 - OWNERSHIP
- Testing FW
 - Hands-on with PCBs, multimeter, logic probes, etc.



Software

Technical

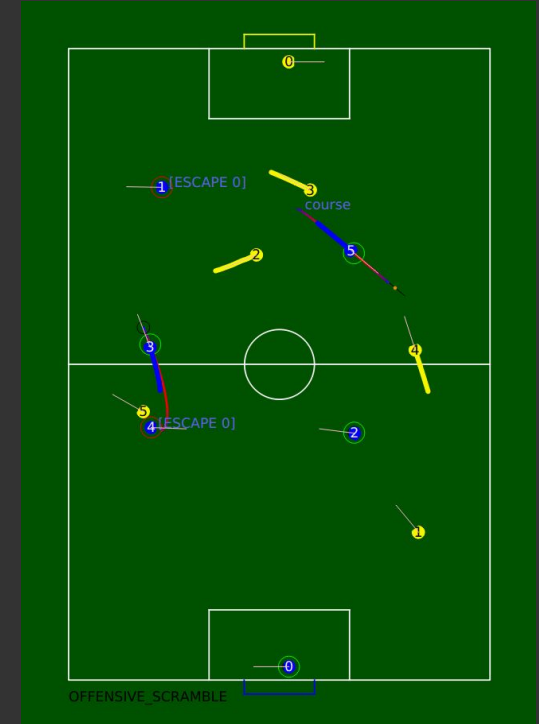
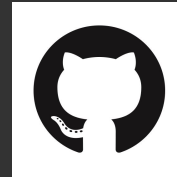
- Motion Planning/Control
- Multi-agent, adversarial AI
- C++/ROS2



ROS 2

Industry Skills

- GitHub
- Ubuntu/Command-Line
- Agile method



Software

2026 Goals:

- Improved Motion Control
- Multi-Robot Coordinators
- Code Cleanse



Training Program

- New members complete tutorial projects / training
 - 5-8 weeks
 - Cross-team collaboration
 - Learn your subteam
 - Make a contribution
 - (Add to your resume)
 - Attend both meetings once complete



Meetings

- **When do we meet?**
 - Sunday: 7:00-10:00 pm, SCC Classroom (All Members)
 - Tuesday: 7:00-10:00 pm, SCC Shop (Returning Members)
- **First New Member Meeting:**
 - Sunday, September 13th from 7:00-9:30 pm, SCC Classroom

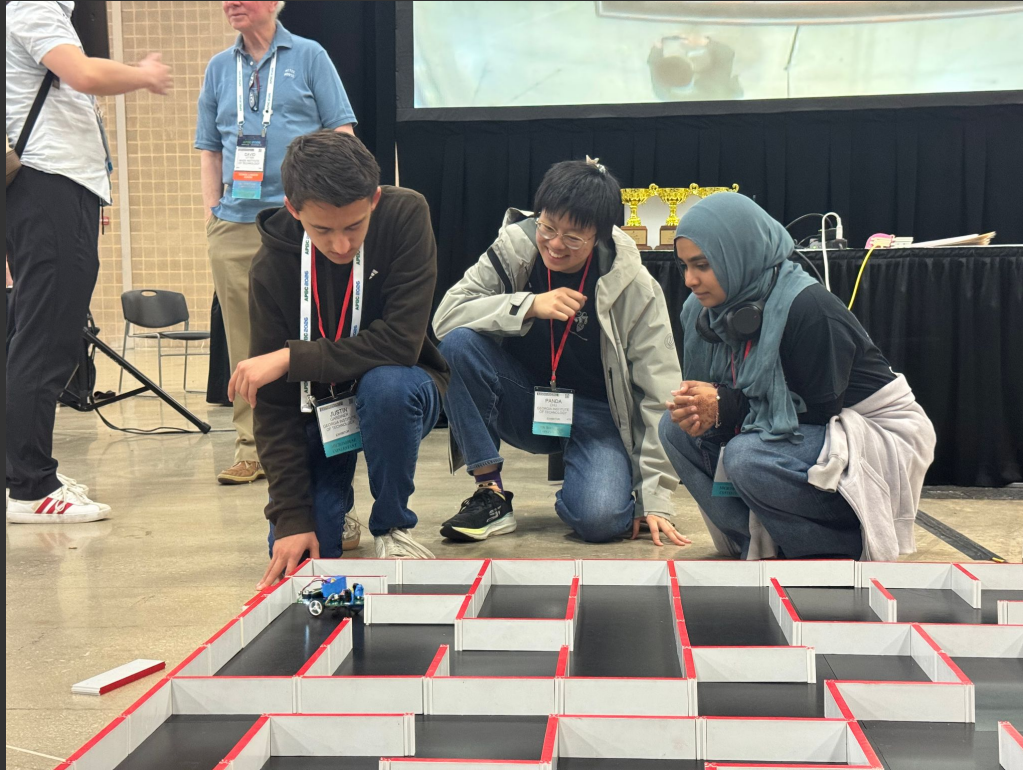




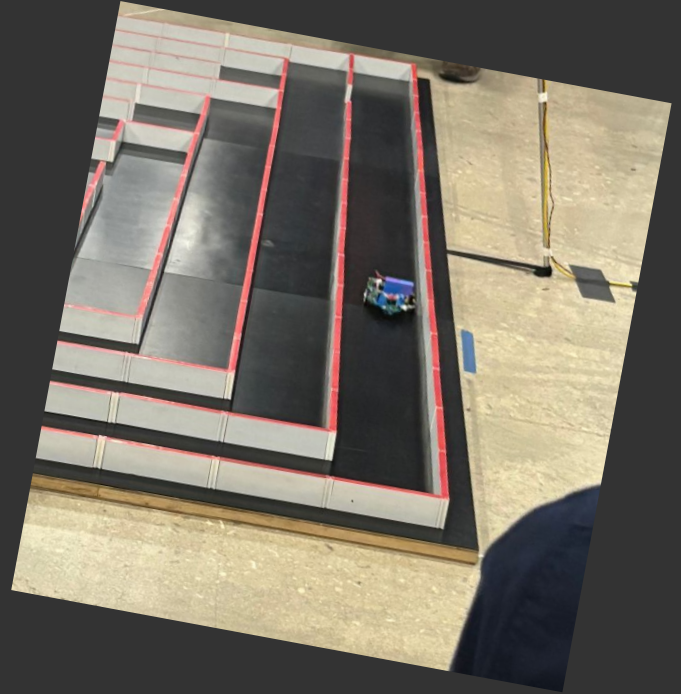
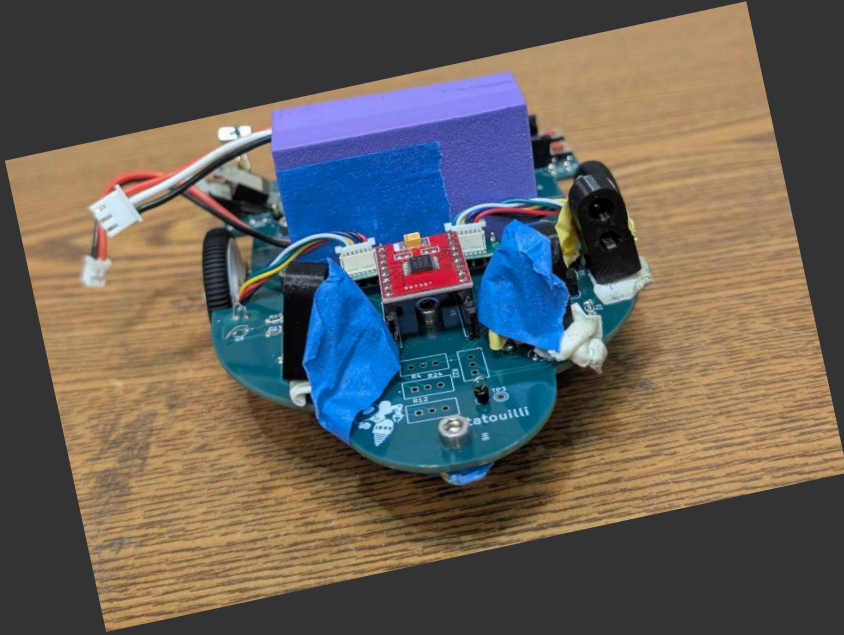
RoboRacing

Justin Dugan

What is RoboRacing?

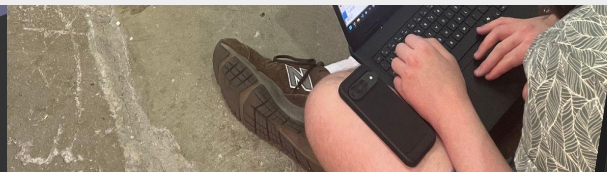
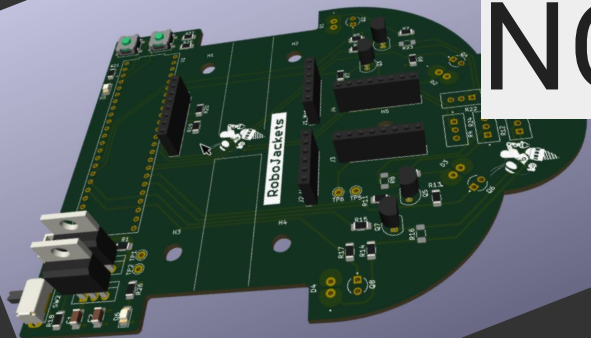


What do we do?



What do we do?

**NO EXPERIENCE
REQUIRED!!!**



```
WorldCoord w = r.getWorldCoord();
if (!started) {
    prevCoord = w;
    double vForward = (r.getDriveSpeedLeft() + r.getDriveSpeedRight()) / 2;
    profile.initialVelocity = vForward * std::cos(w.theta);
    started = true;
}

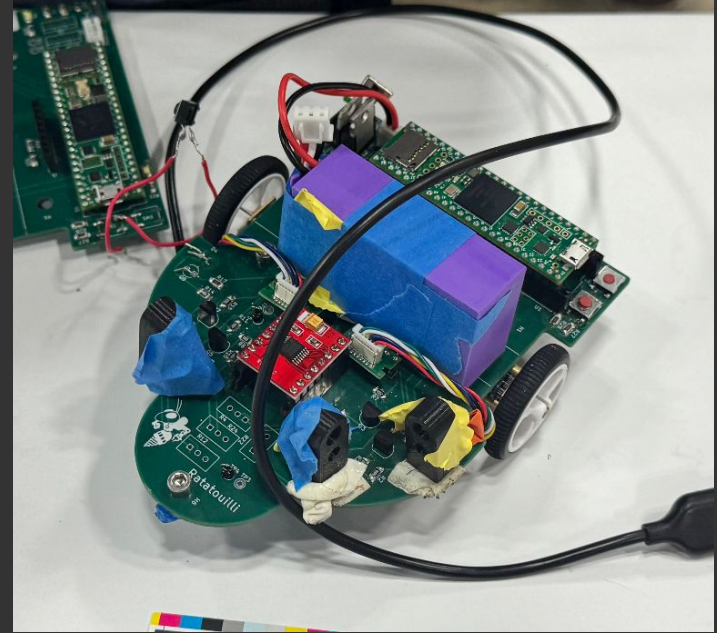
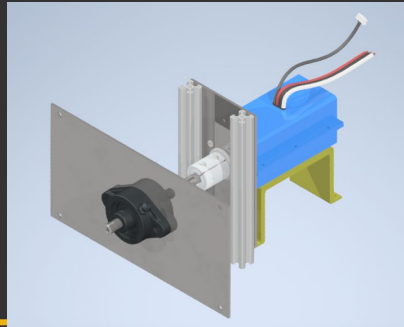
w.x = w.x - prevCoord.x;
w.y = w.y - prevCoord.y;
angle += dx * std::cos(angle) + dy * std::sin(angle);
prevCoord = w;

error = setpoint - measurement;
double v = profile.calculate(r.getDt(), measurement);
double c = 0;
double gyroError = angle - w.theta;
gyroError = std::atan2(std::sin(gyroError), std::cos(gyroError));
if (std::abs(ir.at(2).x) < IR_VALID_RANGE &&
    std::abs(ir.at(3).x) < IR_VALID_RANGE) {
    c = irPID.calculate(ir.at(3).x, -ir.at(2).x - IR_CENTER_OFFSET);
} else if (std::abs(ir.at(2).x) < IR_VALID_RANGE) {
    c = irPID.calculate(ir.at(2).x, IR_LEFT_ONLY_SETPOINT, r.getDt());
} else if (std::abs(ir.at(3).x) < IR_VALID_RANGE) {
    c = irPID.calculate(ir.at(3).x, IR_RIGHT_ONLY_SETPOINT, r.getDt());
}
c += gyroPID.calculate(-gyroError, 0, r.getDt());
r.driveVelocity(v - c, v + c);
}
```

Mechanical

Learn:

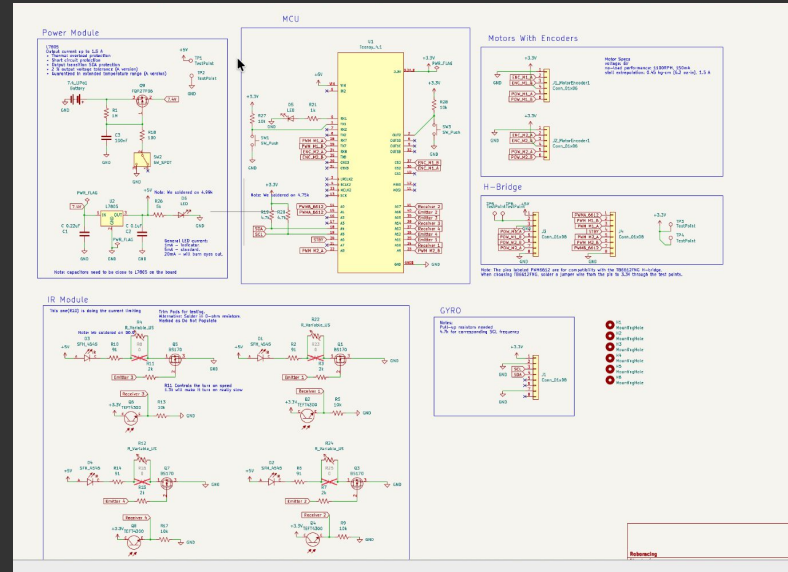
- CAD
- 3D Printing
- Machining and manufacturing



Electrical

Learn

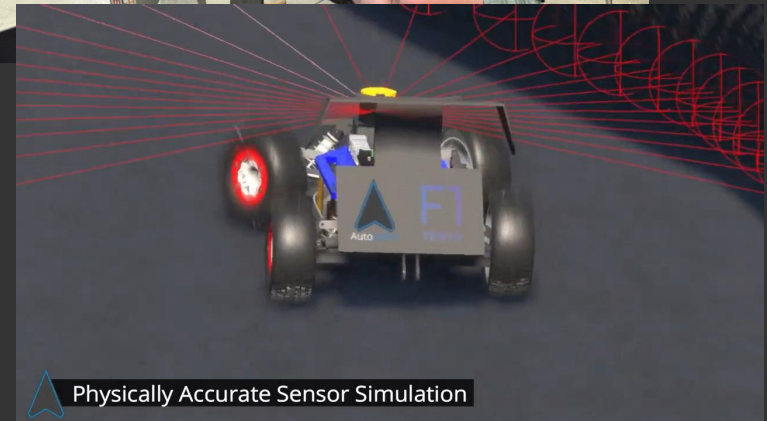
- KiCAD
- Soldering
- Debugging firmware (STM32, Teensy)



Software/firmware

Learn:

- Control algorithms (PID, motion profiling)
- Pathplanning
- Low level firmware
- PlatformIO
- GitHub
- C++
- ROS (F1Tenth)



Goals

- Improve IR sensors
- Switch away from breakout boards
- Shrink the PCB
- Improve odometry correction
- Improved path optimization



Meetings

New Member Info Meeting

- Wednesday, September 16 in George Tower 0210
- Friday, September 18 in Skiles 271

When Do We Usually Meet?

- Sundays: 4-7 PM EST (SCC)
- Mondays: 7-9 PM EST (SCC)
- Thursday: 7-8:30PM EST (Van Leer)





RoboWrestling

Xander Riddle

What we do: (in a nutshell)

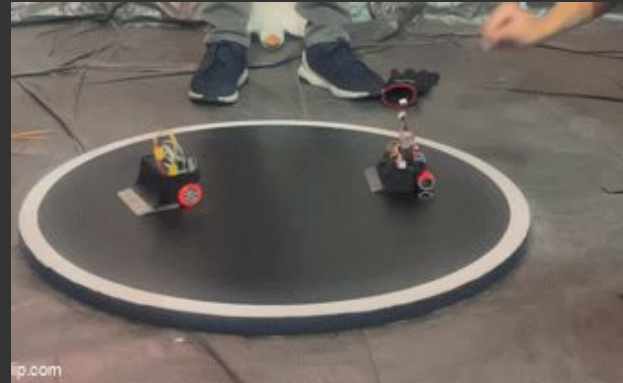
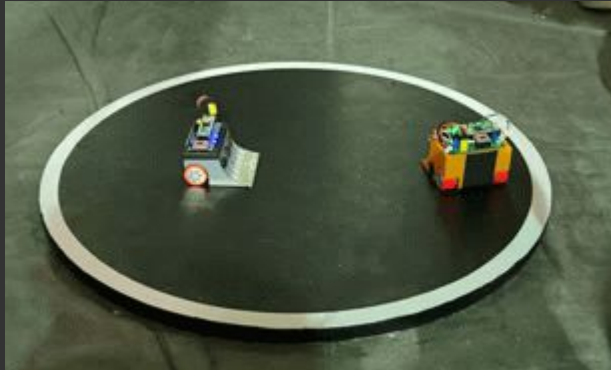
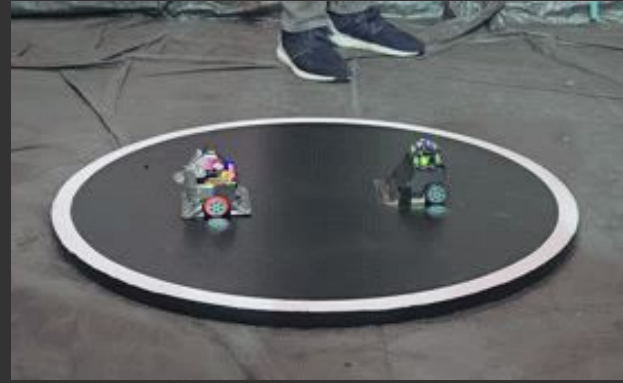


What is RoboWrestling?

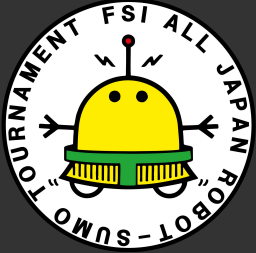
- Autonomous Robotic Sumo Wrestling
 - Push opponent out of Dohyo
- What this entails:
 - Real Time Sensor Detection
 - Precise Mechanical Design/
Fabrication
 - Outthinking our opponent with
epic software strategies



What you will be working on



Past Competitions



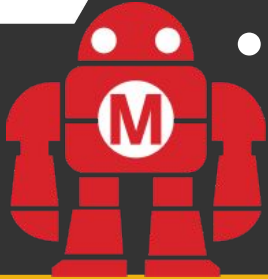
- **All-Japan Robot Sumo Tournament (Tokyo, Japan)**

- International Grand Finals
- US Representative 3kg Auto



- **RSM Challenge Internacional (Mogi das Cruzes, Brazil)**

- Largest Sumo Competition in Latin America (over 350 participants)
- 4th in 3kg and 500g



- **Maker Faire (Orlando, Florida)**

- Maker Faire!
- 1st, 2nd, and 3rd in 500g auto

Competitions!

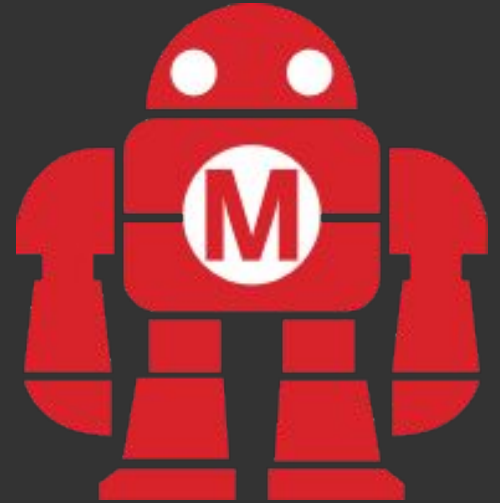
RoboChallenge
(Bucharest, Romania)
November



RSM Challenge
(Mogi das Cruzes, Brazil)
April



Maker Faire
(Orlando, Florida)
November

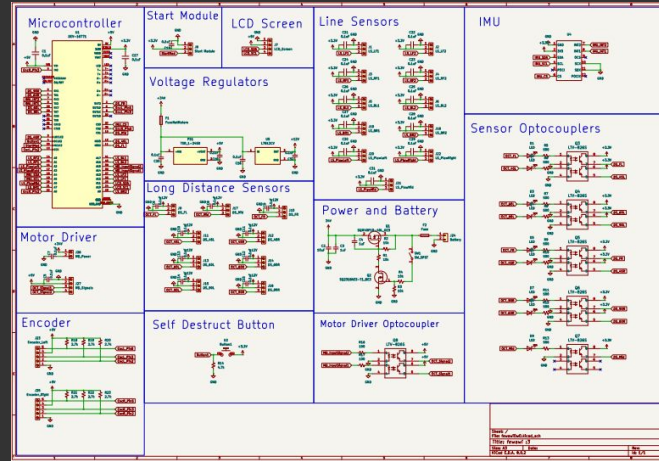
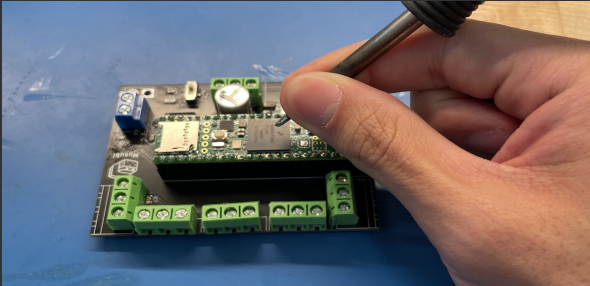


Electrical

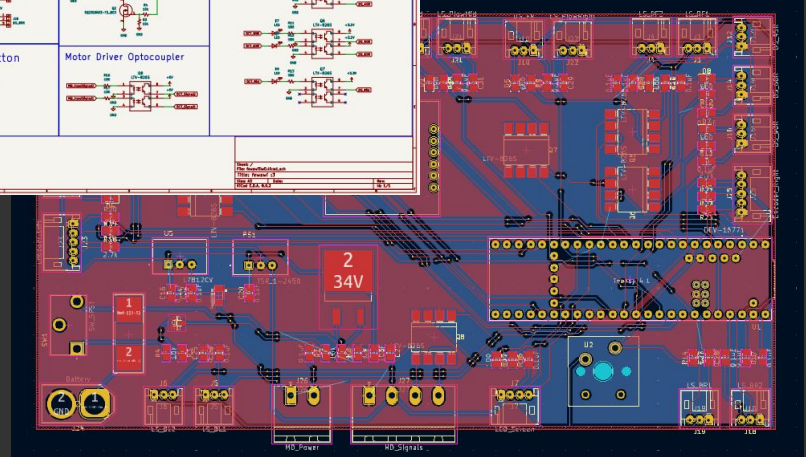
Custom new PCBs for every bot

Learn:

- Kicad
- Github
- Soldering



KiCad



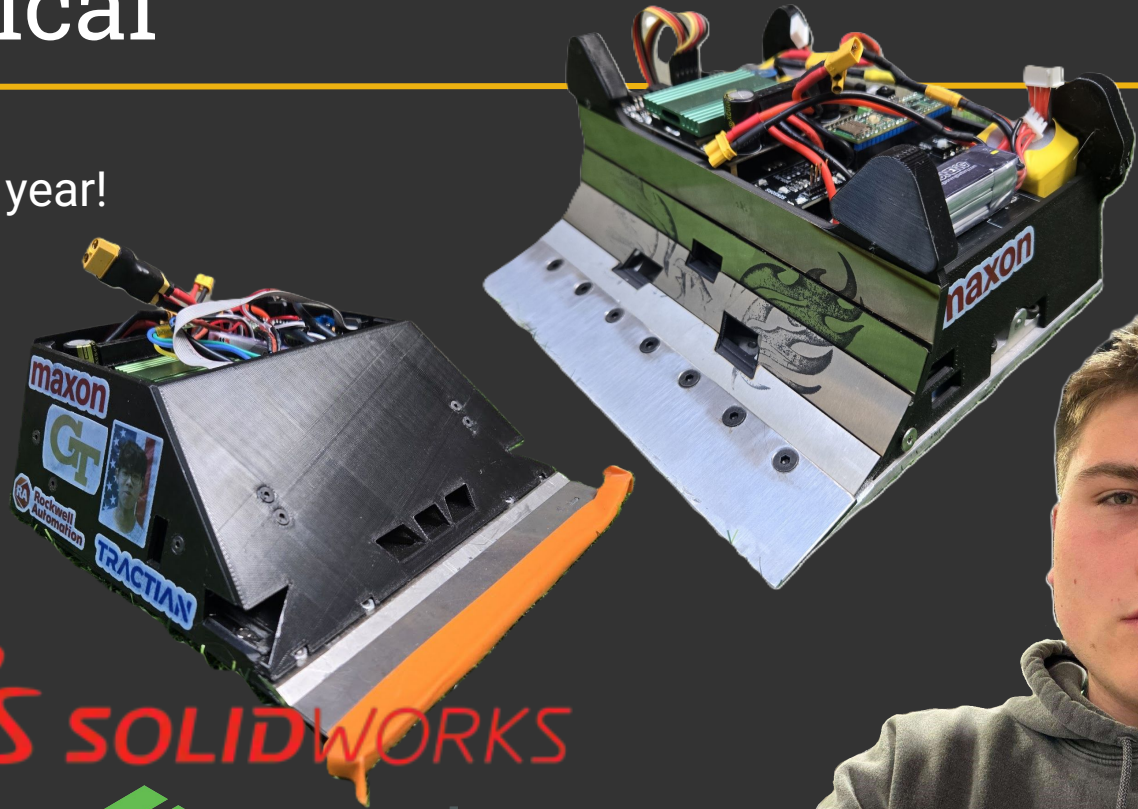
*Note: DO NOT DO THIS!!!

Mechanical

New bot designs every year!

Learn:

- CAD Designing
- Machining
- 3D Printing



 **SOLIDWORKS**



onshape®



Software

Sumo bots are Autonomous! (mostly)

Learn:

- Arduino Programming
- C++
- PlatformIO
- Github

Your code has real world consequences!



Leadership



Cody Gee



Fiona Li



Raymond Yao



Quinlan Kortbus

New Projects for the year



Meetings

- **RoboWrestling New Member/Info Meeting**
 - Tuesday, September 15th, 6:00-8:00pm - Van Leer C240
 - Friday, September 18th, 6:00-8:00pm - Skiles 255
 - Show up if you are interested!!!!
- **When do we typically meet?**
 - Monday (SCC): 7:00-9:00 pm
 - Cookout: 9:00-9:30 pm
 - Sunday (SCC): 1:00-4:00 pm





Outreach

Charlotte Jolley

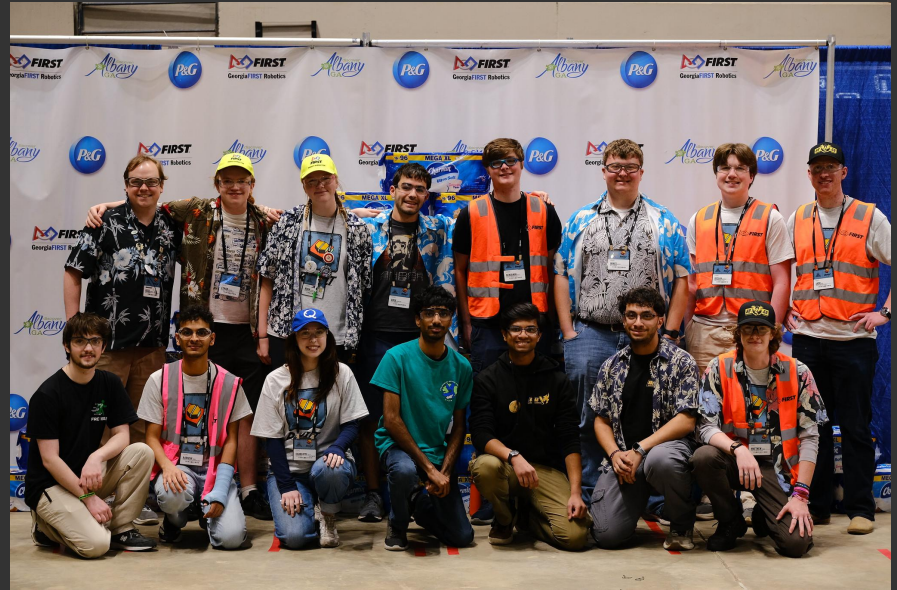
What is RJ Outreach?

- An organization-wide effort?* —→ Yes!
- A way to Promote, Educate and Advance?* —→ Yes!
- A great place to volunteer?* —→ Yes!
- A way to get to know other RJ members?* —→ Yes!
- A way to get free food?* —→ Yep, that too.



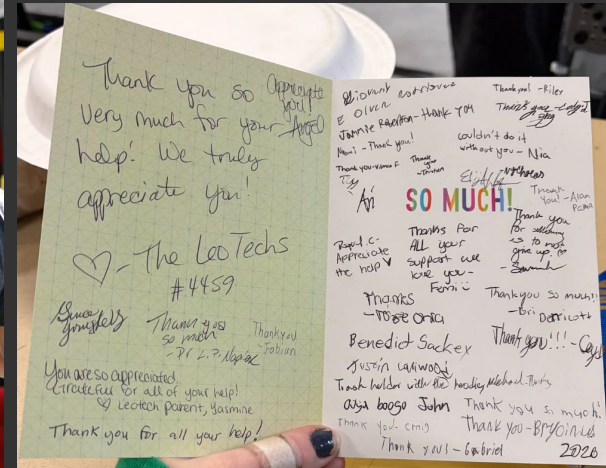
How We Get Involved

- Volunteering at competitions
 - GRITS, qualifiers, DCMP
 - FLL



How We Get Involved

- Volunteering at competitions
 - RoboJackets Help Desk



How We Get Involved

- Table at events
 - Science fairs, demos

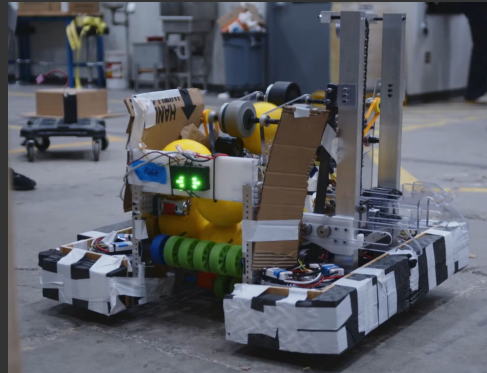


How We Get Involved

- Creating events
 - Ri3D - FRC
 - Ri30H - FTC

Event Roles:

- Media!!!
- Design
- Electrical
- Programming
- Machining
- Field build



Why Outreach?

- Community benefits
- Networking opportunities
- Adjustable commitment
- Make friends!



How You Get Involved

- Join #outreach on RJ Slack
 - Join #first-ri3d
- Scan the QR Code
- Volunteer!
- Meet others!
- Suggest ideas

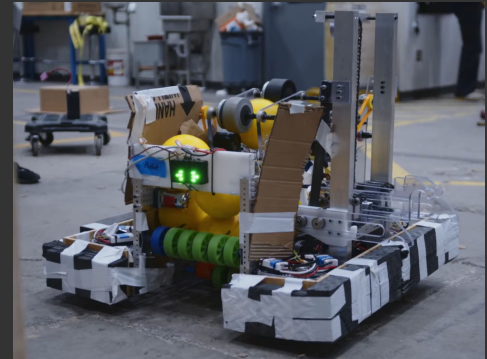
first-ri3d

outreach



Important Dates

- Robot in 30 Hours: September 12th
- Outreach GI: September 17th – Skiles 255
- STING: September 18th-20th
- GRITS: October 15th-17th
- Ri3D/FRC Kickoff: January 9th, 2027



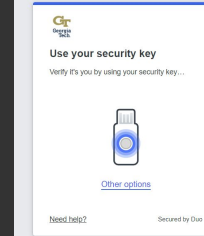


Behind the Scenes

*Dylan Park, Elysse Ahmad Yusri,
Natalie Ferry, & Evan Lopez-Ramirez*

Information Technology

- Server and workstation administration
- Identity and access management
- Application support
- Network engineering
- Web App & Public-facing Site Development



Jobs

Q Search jobs...

X

Type

Node Pool

Status

Datcenter

Prefix

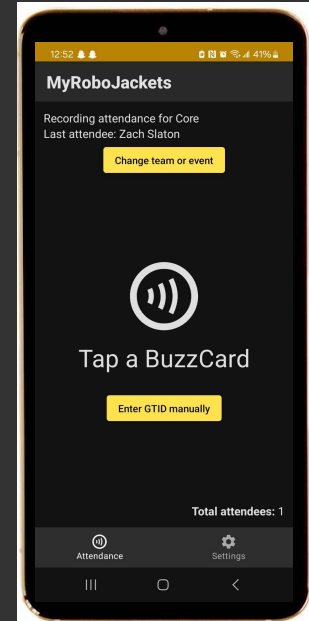
Run Job

Name	Status	Type	Node Pool	Priority	Groups	Summary
divvy-onboarding-ux-production	RUNNING	service	default	50	1	
jedi	RUNNING	service	default	50	1	
metabase	RUNNING	service	default	50	1	
apiary-production	RUNNING	service	default	50	1	
meilisearch-v1-3	RUNNING	service	default	50	1	
loop-production	RUNNING	service	default	50	1	
tika	RUNNING	service	default	50	1	
vouch	RUNNING	service	default	50	1	
meilisearch-v1-2	RUNNING	service	default	50	1	
keycloak	RUNNING	service	default	50	1	
registry	RUNNING	service	default	50	1	

Mobile App Development

Goal: Cross-platform RoboJackets app as a refactor of the existing Android (Kotlin) app

- Technologies: React Native, TypeScript, NFC Integration
- Pending features: Merchandise, Testing, Sentry Integration



Web App Development

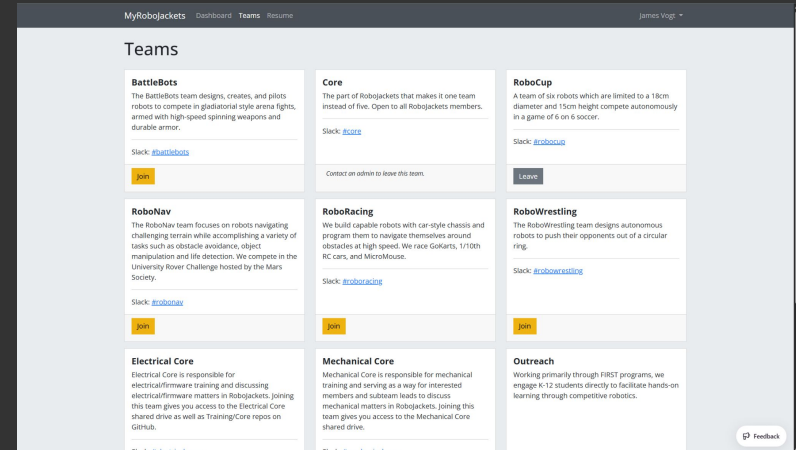
Goal: Resume book on myrobjackets.org for sponsors to search and store resumes more efficiently

- Stack:

- Laravel
- PHP
- [Vue.js](https://vuejs.org/)
- MySQL



- Pending features: Search, Mailing, Folders



Web App Interest Form



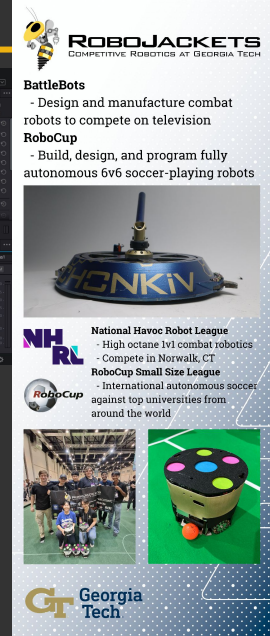
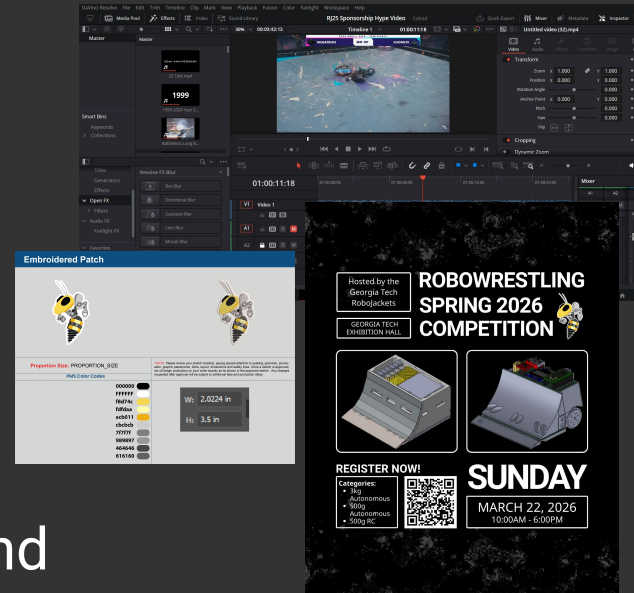
← Fill out the [Interest Form!](#)

Contact: eyusri3@gatech.edu

- You can participate in this team at the same time as another RJ team
- Our interest meeting will be on Wed 9/16, 7-8 PM in Skiles 246.

Public Relations and Media

- Design and Produce Merchandise
- Gain experience in Graphic Design and Video Editing
- Work on large-scale Live Stream Productions
- Help grow RoboJackets' brand across the internet and the GT Community



PR and Media Interest Form



← Fill out the [Interest Form](#)!

- Interest meeting is on Monday, September 14th in Skiles 241 from 6pm-8pm(ish)
- Point of contact: natalie.ferry@robojackets.org

Finance Team

Evan Lopez-Ramirez | Treasurer

- Manage club finances and budgets
- Help plan how to allocate funds

Declan Amerault | Sponsor Chair

- Sponsorship Acquisition, Tracking, & Retention



Training

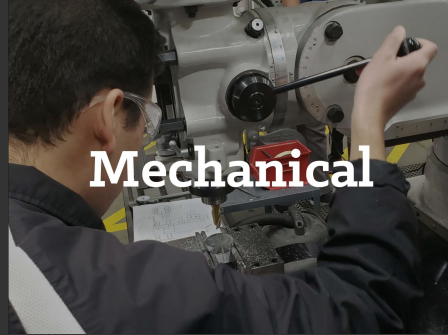
Mechanical: Tristan Wilson

Electrical: Aiden Lee

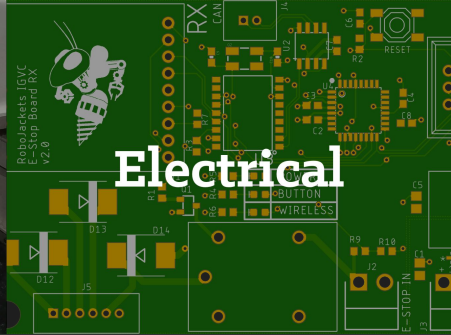
Firmware: Jaxon Parriott

Software: Justin Gardiner and Sanat Dhanyamraju

Training Disciplines



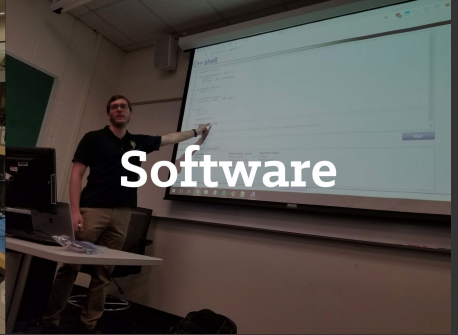
Mechanical



Electrical



Firmware



Software

First Meetings: Week of September 15th

You don't need **ANY PRIOR EXPERIENCE** to join any particular discipline!

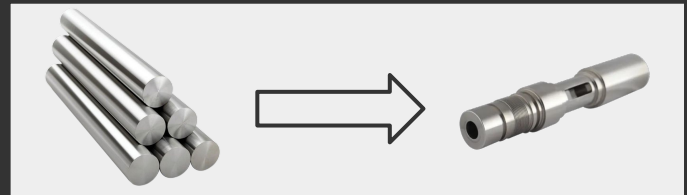
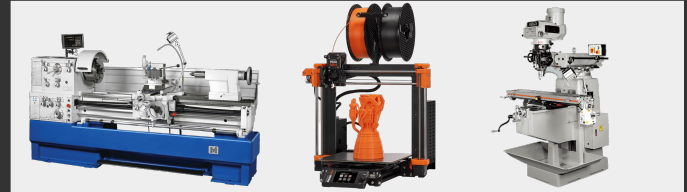
Mechanical Training

- 6 Weeks of Training
- Design Principles
 - Mechanics & Materials
 - Design for Manufacturing
- Computer-aided Design
 - Autodesk Inventor 2027
- Manufacturing
 - Utilizing shop machines + tools

Meeting Times (Only attend 1/week!):

Tuesdays 6:30-7:30p (Skiles 271)

Wednesdays 6:30-7:30p (East Arch. 123)



Electrical Training

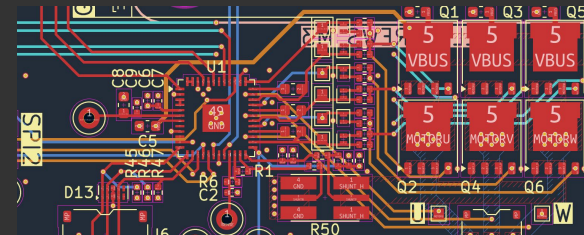
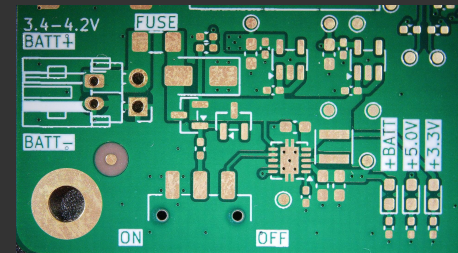
- **Schedule**

- [9/14 or 9/17] Fundamental Circuit Theory
- [9/21 or 9/24] Circuits in the Real World
- [9/28 or 10/1] Practical: Soldering Training
- [10/5 or 10/8] KiCAD: Planning & Part Selection
- [10/12 or 10/15] KiCAD: Schematic Capture
- [10/19 or 10/22] KiCAD: Layout & Routing

- **Location**

- Mondays 5:00 – 8:00 @ Skiles 270
- Thursdays 5:00 – 8:00 @ Van Leer C340

- Highly encouraged to also take Firmware Training!



Firmware Training

- **Schedule**

- Week 1 - 9/17 or 9/18* - C++ & Firmware Basics
- Week 2 - 9/24 or 9/25 - Interrupts & Analog I/O
- Week 3 - 9/28 or 10/1 - Practical Soldering Training
- Week 4 - 10/8 or 10/9 - Communication Protocols
- Week 5 - 10/15 or 10/16 - Driver Design
- Week 6 - 10/22 or 10/23 - State Machines & RTOS

- **Location**

- Skiles 271 (except 9/18)
- 9/18 - Skiles 171

- **Times**

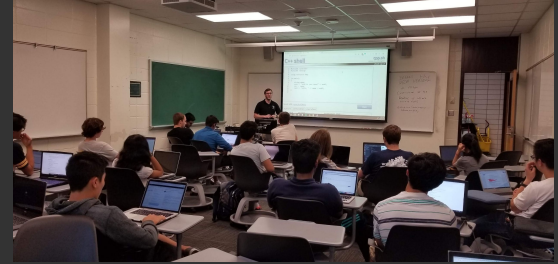
- 6 - 8pm Thursday/Friday



* Electrical Training is also highly highly encouraged! (5-8pm Monday/Thursday)

Software Training

- Syllabus:
<https://github.com/RoboJackets/software-training>
- Topics:
 - Ubuntu/Git
 - C++
 - ROS2



ROS 2™



Training starts September 17th!

When: Thursdays 8-9pm

Where: Skiles 168

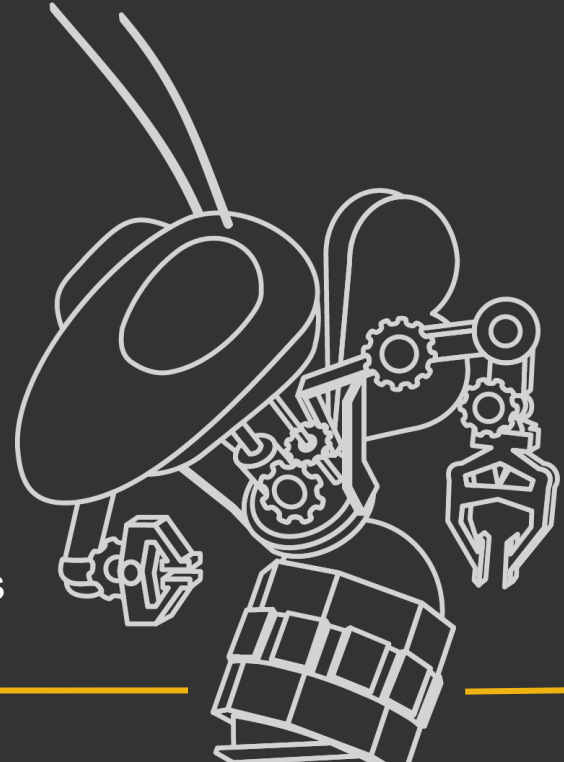


How to Join

Brooklyn Heath

How to Join

1. **Attend a General Interest Meeting**
2. **Talk to team leadership** in the following Q&A
3. **Team Interest Meetings!**
4. **Attend meetings and trainings**
 - Showing up to team meetings is the best way to make sure you stay involved
5. **Pay RoboJackets dues (Sept. 19)**
 - \$65 for a semester or \$120 for the year
 - Contact us if you have any financial limitations



Team Interest Meeting Dates

- **BattleBots**
 - Mon 9/14 | Skiles 255 | 6:00-8:00 or Tue 9/15 | Skiles 269 | 6:00-8:00
- **RoboNav**
 - Tues 9/15 | MoSE G011 Classroom | 6:30-8:30 or Wed 9/16 | Skiles 271 & 255 | 6:00-8:00
- **RoboRacing**
 - Wed 9/16 | George Tower 0210 | 6:00-8:00 or Fri 9/18 | Skiles 271 | 6:00-8:00
- **RoboWrestling**
 - Tue 9/15 | Van Leer C240 | 6:00-8:00 or Fri 9/18 | Skiles 255 | 6:00-8:00
- **RoboCup**
 - Sun 9/13 | SCC Classroom (575 15th St NW) | 7:00-9:00
- **Outreach**
 - Thurs 9/17 | Van Leer C240 | 6:00-8:00
- **PR**
 - Mon 9/14 | Skiles 271 | 6:00-8:00
- **Web Development**
 - Wed 9/16 | Skiles 246 | 7:00-8:00

When We Meet

Bold** = New Member Meeting

Only 1 team meeting + 1 training meeting necessary

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
RoboWrestling** 1:00 - 4:00 PM	RoboWrestling** 7:00 - 9:00 PM				
RoboNav** 4:00 - 7:00 PM			RoboNav** 6:30 - 9:00 PM		
RoboRacing 4:00 - 7:00 PM	RoboRacing** 7:00 - 9:30 PM			RoboRacing** (Van Leer) 7:00 - 8:30 PM	
RoboCup** 7:00 - 10:00 PM		RoboCup 7:00 - 10:00 PM			
		BattleBots** 7:00 - 9:00 PM		BattleBots** 7:00 - 9:00 PM	BattleBots** 7:00 - 9:00 PM

New Member Trainings (Starts 9/14)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
			Mechanical 6:30 - 8:00 PM		
				Firmware 6:30 - 8:00 P.M	Firmware 6:30 - 8:00 P.M.
	Electrical 5:00 - 8:00 PM			Electrical 5:00 - 8:00 PM	
				Software 8:00 - 9:00 PM	

Refer to <https://robojackets.org/calendar/>

Only 1 team meeting + 1 training meeting necessary

Helpful Links

Website: <https://robojackets.org/>

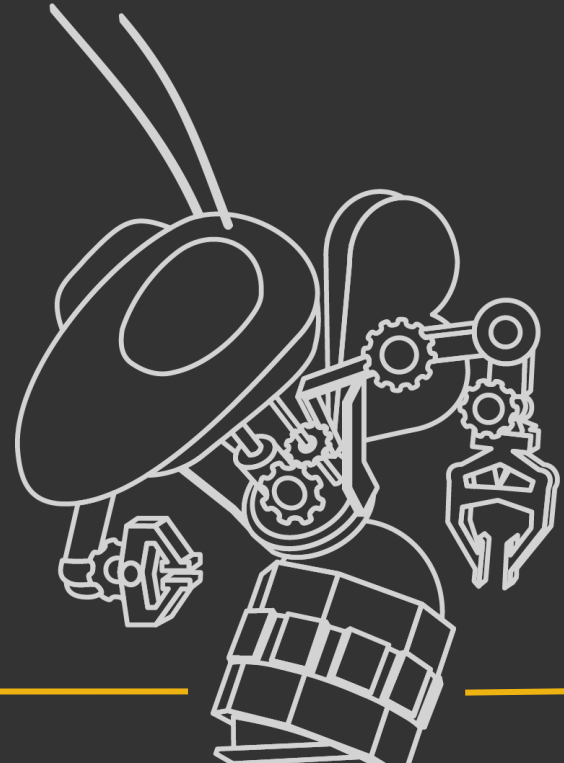
Robojackets Wiki: <https://wiki.robojackets.org/>

Slack: <https://slack.robojackets.org>

Linktree: <https://linktr.ee/robojackets>



Questions?



Thank you!

