Carnegie Mellon
ROBOTICS CLUB

Fun With Robots!

Spring 2026

Your Human Leaders

Matthew Kibarian

Nick Yaeger

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Your Human Leaders

Matthew Kibarian

From: Los Altos, CA

Major: ECE, MSE Minor

Semester teaching FWR: 2

Robot things:

- FRC (team 751: mechanical design, 3 years; Vendor product development, 1 year)
- FWR Student (F24), TA (S25)

Nick Yaeger

From: Katy, TX

Major: ECE

Semesters teaching FWR: 2

Robot things:

- CMR (Carnegie Mellon Racing) Grounded Low Voltage Team
- FWR Student (F24), TA (S25)

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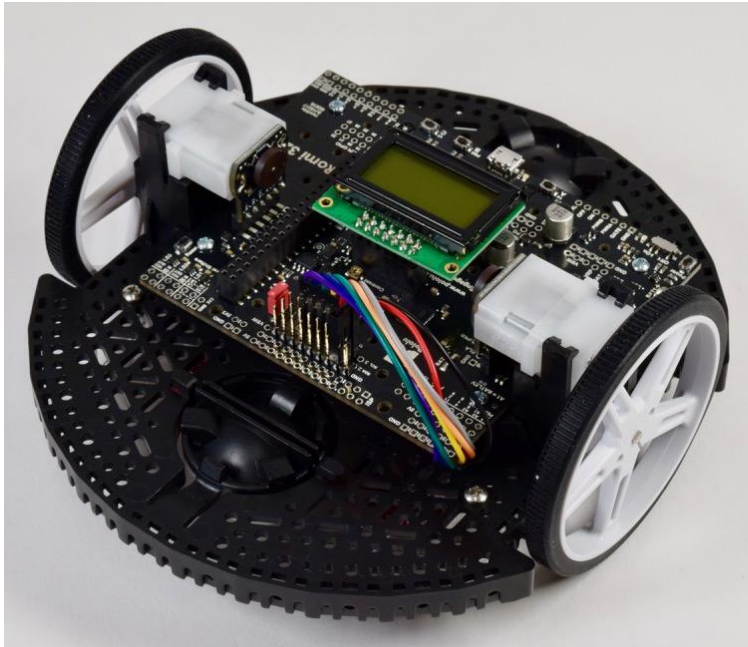
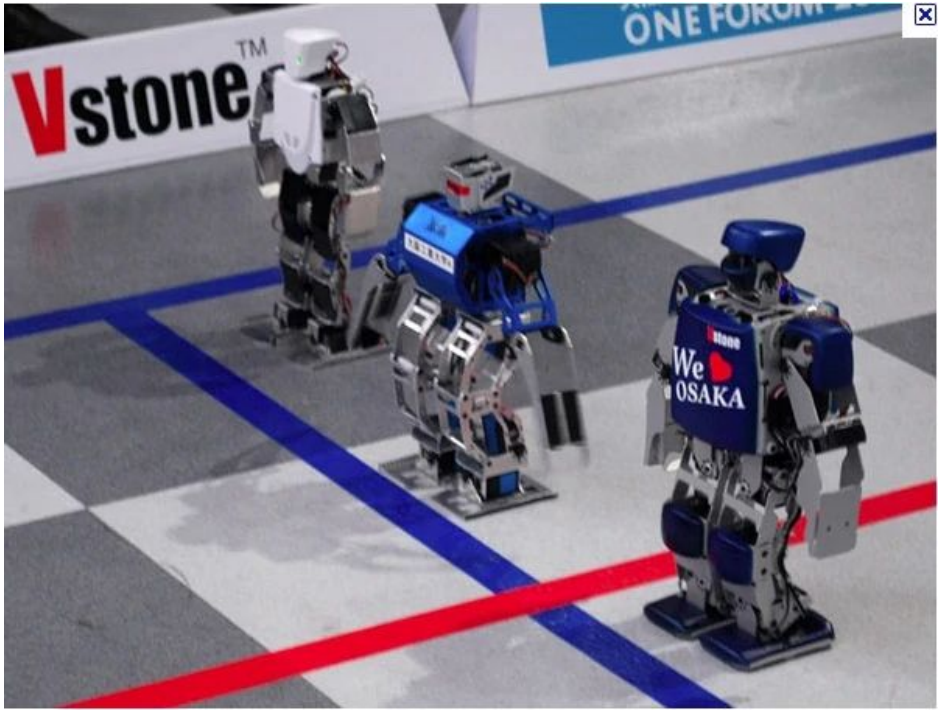
Course Plan

- Fun!
- With Robots!
- Square Lab! (Intro to robots and basic programming)
- Photovore! (Sensors)
- Line Following! (Control)
- Actuation Lab! (Servos)
- Pathfinder Lab! (Comprehensive)
- More!



Class Structure

- Short lecture (most weeks)
- Work time!
  - With candy B)
- End of a lab: compete with classmates!



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Silly Bus

- Attendance
- Lab Fee
- Grading
- Expectations
- Other boring stuff...

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Attendance

- Attendance will be taken by an attendance quiz on Canvas
  - Code word will be shown every lecture
  - Submit the attendance quiz by the end of class
- StuCo Policy: > 2 unexcused absences = fail :(
  - ***PLEASE*** let us know if you can't come (so that we can excuse your absence)
- Tardiness counts as an absence (30 min or more)

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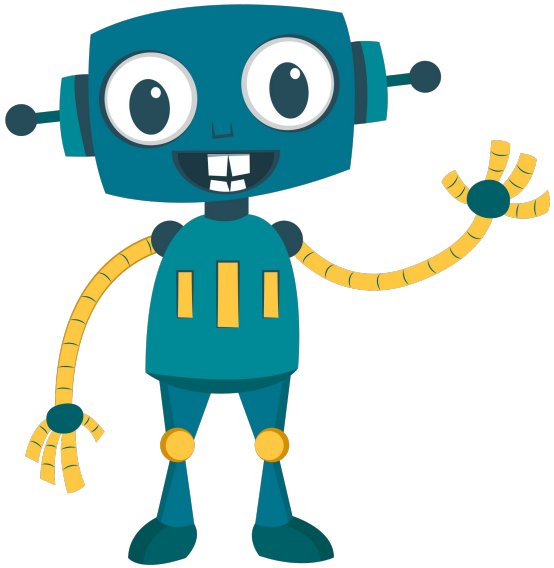
Survey!

https://forms.gle/DPqhs8FHNC92Qw6n8

This survey helps us gauge how well we teach you throughout the semester!

Please fill it out so we can get better!



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Grading

- Labs are graded pass/fail
  - Need to pass ***four (4) out of 5*** labs
  - Can do three labs and an optional lab
- To pass a lab
  - Demonstrate that your robot completes the task

Discord Server

Access lecture slides, lab slides, virtual OH, chat with peers/instructors, and more…

discord.gg/e2RsFzUMMG

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The Labs

Square Lab

- Send commands to make your robot move!
  - Eventually, in a square!
- Then, robot dance competition!
  - Twerking robots, Cha Cha Slide robots, robots singing and dancing, robot waltzes....the sky's the limit!

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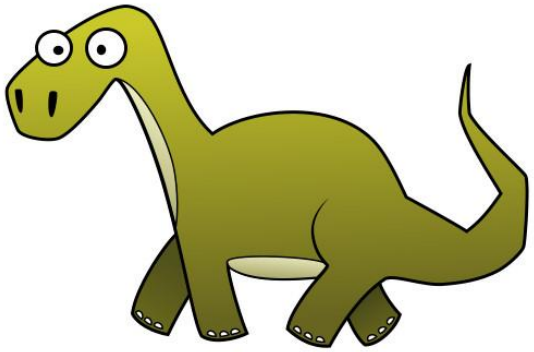
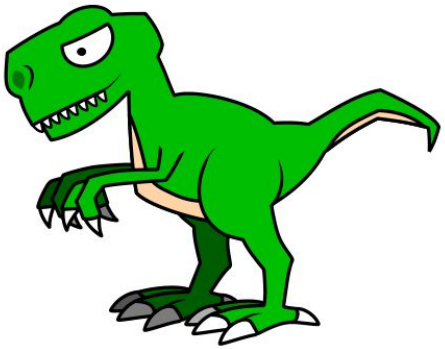
Photovore Lab

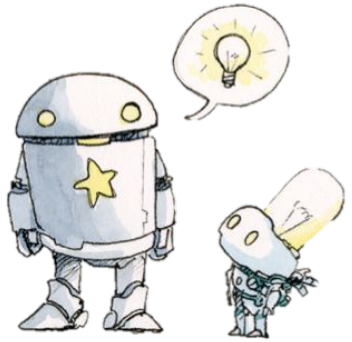
- Herbivore



- Carnivore



- Photovore



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Photovore Lab

- Learn about sensors!
  - Make your robot sense light using sensors
  - Make your robot drive to the light!
- Try to beat others in both speed or distance!
  - We've had robots go from the hallway to the light bulb, detecting if they are stuck along the way!

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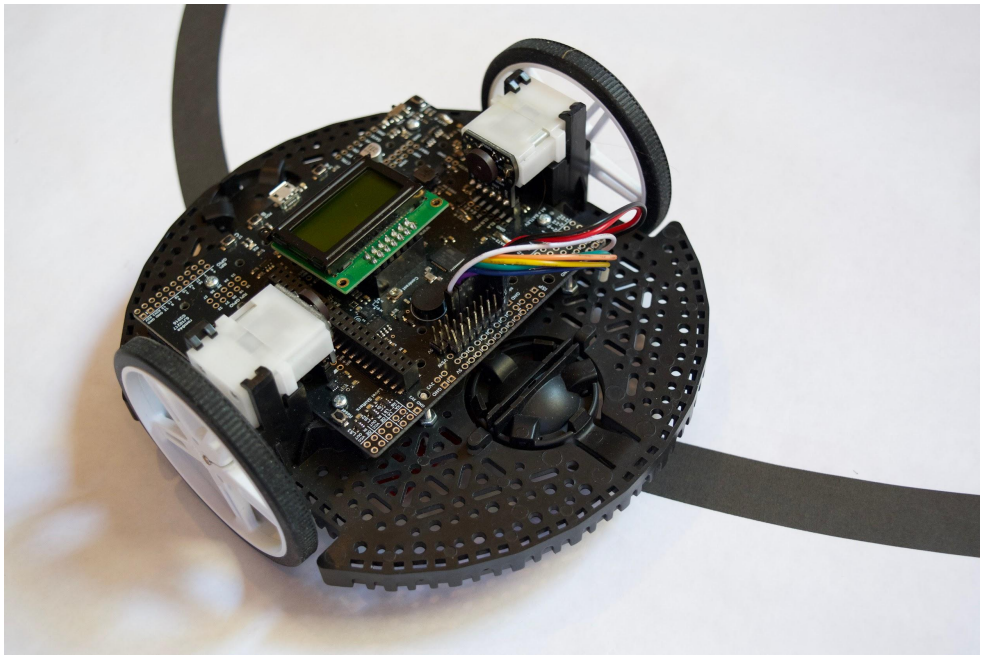
Control Lab

- Learn more complicated control algorithms!
- Make your robot find its way along a line
- Race for the fastest lap time!



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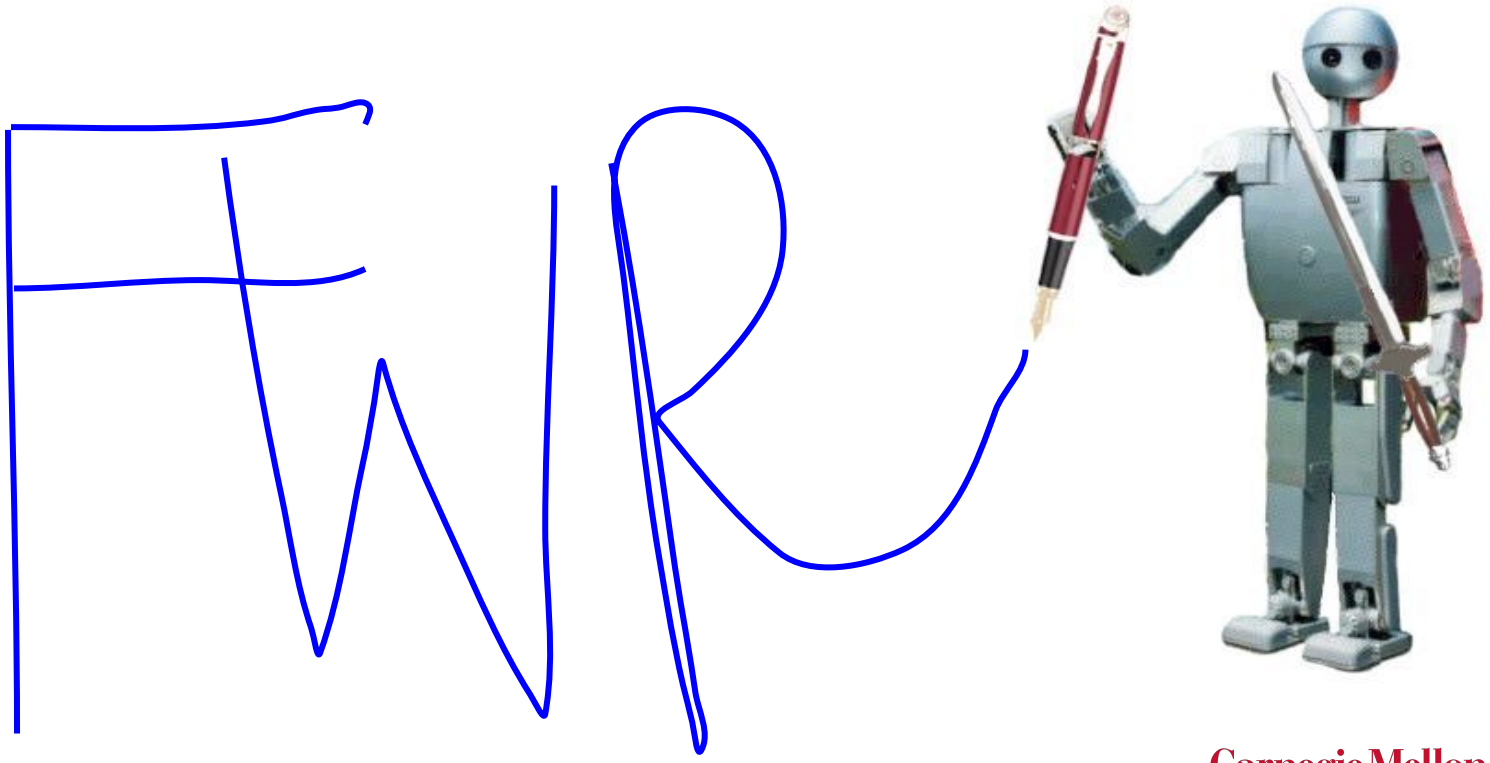
Actuation Lab

- Draw something cool with your robot and a pen!
- Or write “FWR” as fast as you can!
- Compete with other people and try to beat their time!



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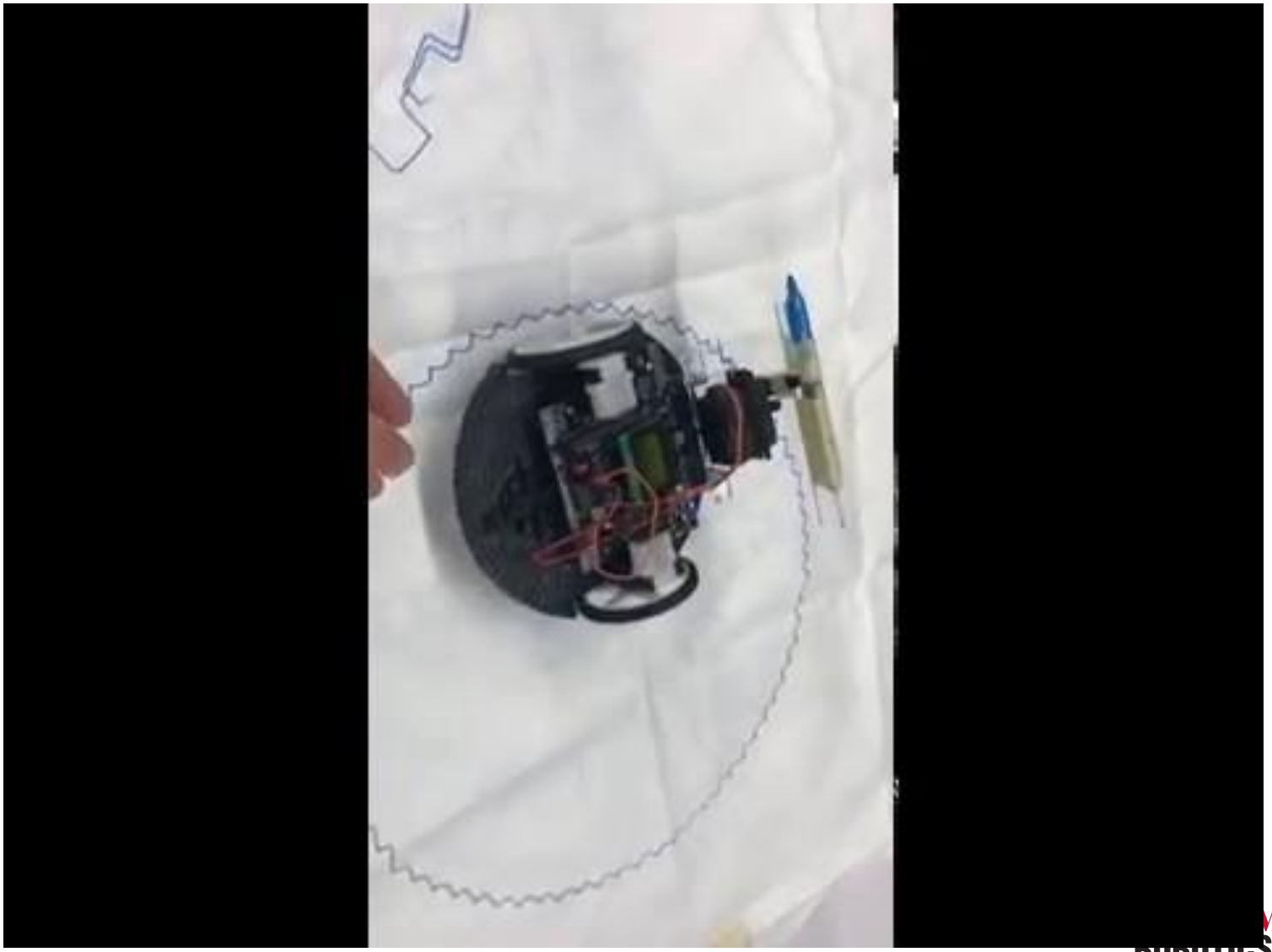
Gear Drawing Robot!



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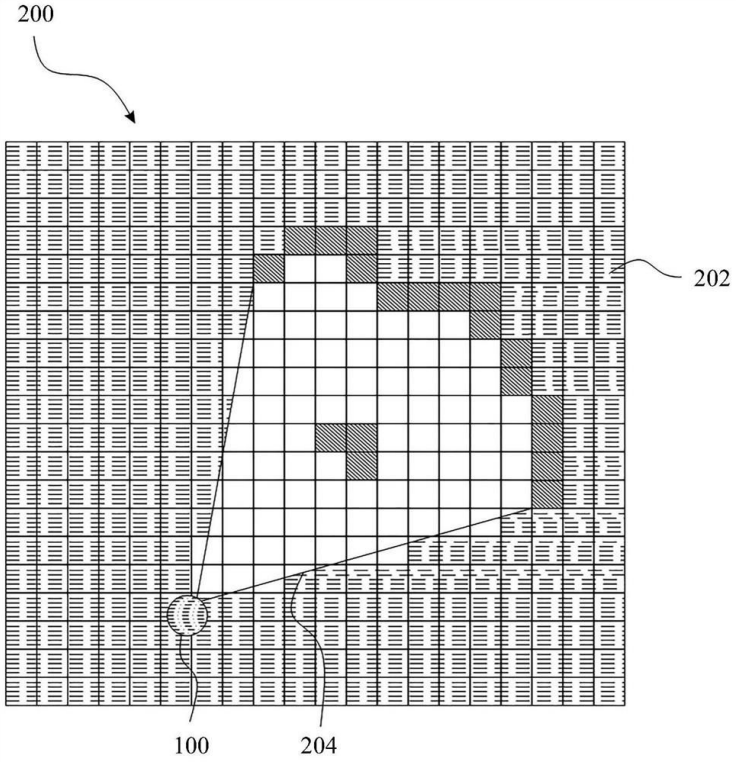
Pathfinder Lab

- Bring it all together!
  - Use sensors and code to perform a 180° ultrasonic sweep, map the area, and choose the best path.
  - A more advanced, open-ended lab that brings together programming, sensing, control, and actuation.

- Navigate with autonomy!
  - Your robot must make decisions about where to go and autonomously drive to the goal box, stopping when it arrives.
- Bonus Challenge!
  - Earn extra credit if your robot can detect when it's stuck and recover on its own!



Optional Labs

- Optional Labs Available
- If you want to learn more robotics for fun, you work on an optional lab
- You can also use these labs to “replace” a main lab if needed.

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Learning Goals

Upon completion of this course, you should be able to:

- Formulate an Arduino program that controls their robot in response to inputs when given a simple task.
- Construct a circuit to connect a resistive sensor to a robot, and explain why a sensor circuit allows their robot to read a sensor.
- Utilize (and optionally, create) existing parts to create an assembly that completes a given task.
- Explain the purpose of each aspect of a PID control and write a basic PID control algorithm so the robot can complete a task effectively and efficiently.
- Describe different areas of robotics and how they are used to create functional robots.

RoboClub

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About RoboClub

"Making Friends, One Robot At A Time" - 2003/2004 RoboClub T-Shirt

- Maker-Space/Social-Space

Why do people join?

- Learn anything or everything robotics-related
- Beginner friendly!
- Electronics Lab & Machine Shop (with training!)
- Corporate and University funding
- Social events

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Club Projects

- **Robobuggy**
  - Participate in one of CMU's iconic, longest-standing traditions--but with a technological twist: Robobuggy!
- **RoboOrchestra**
  - Goal: Automate instruments to play music! Written scores & improv
- **Prosthetics**
  - Goal: Create mechanical prosthetic arms

*prosthetics did not give me a picture so i had to improvise

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Club Projects Cont.

- **Combat Robotics**
  - Build a BattleBots-style fighting robot together, and compete nationally!
- **3D Printer Project**
  - Building a custom 3D printer!
- **Quadrupeds (NEW)**
  - Work on designing, programming, and building a quadrupedal robot!
- **StuCo!**
  - 98-012: This Class!
  - 98-341: Build Your Own Breadboard Computer (also fun, would recommend)

*none of these projects gave me pictures so i had to improvise

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Club Events

- **Red Robot Hackathon!**
  - A beginner-oriented hardware hackathon for the CMU community
  - Usually in the 2nd half of the Fall Semester
  - Comes with food and prizes, don't miss out!
  - redrobot.roboclub.org
- **Small Helpful Research Grant (SHRG)**
  - Twice a year, roboclub gives out small grants for people to work on their personal projects
  - This past semester, projects include a newspaper folding machine, pipette pulling machine, a 6502 based RPN calculator, and a BB8!
  - Keep a lookout in the roboclub discord for more information

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How to Join

Social Media:

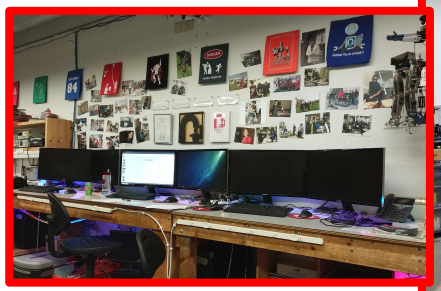
Discord: https://discord.gg/rnPgqXat7m

E-mail: officers@roboclub.org

Website: roboticsclub.org

Facebook: facebook.com/groups/cmuroboclub

Instagram: @cmuroboticsclub



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