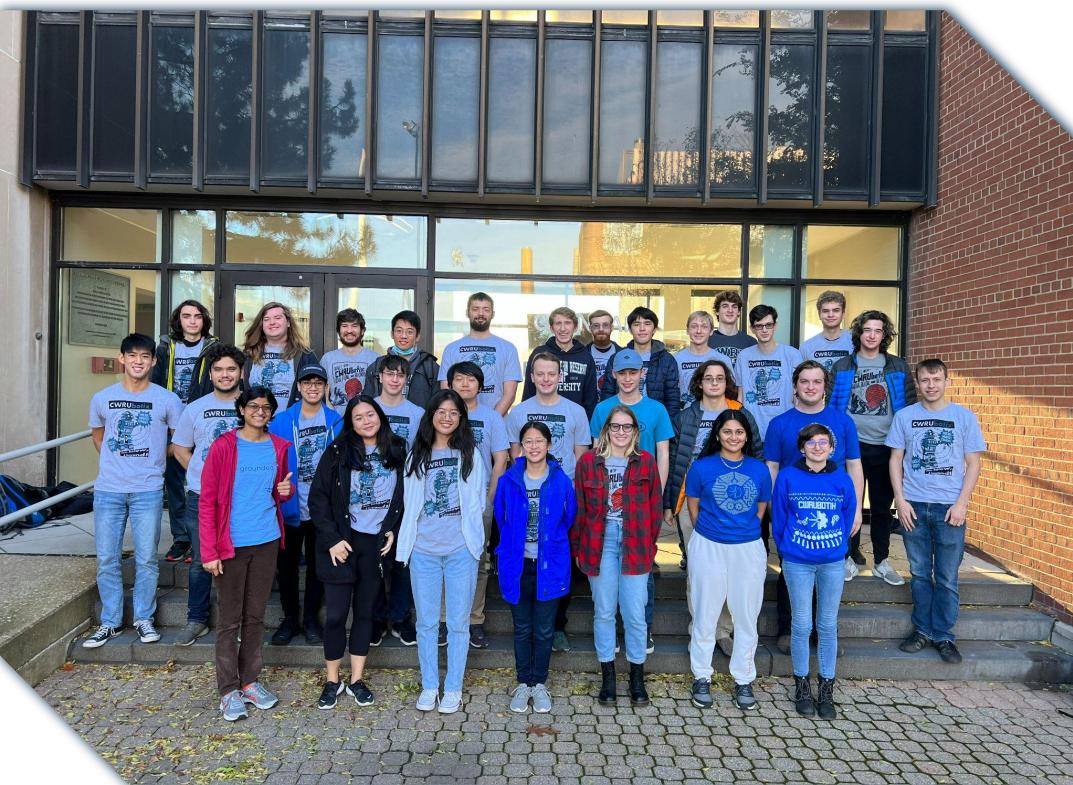




CWRUbotix



Over the years, we have built Lunar mining robots, underwater robots, combat robots, maze solving robots, and much more.

To ensure that all our members have the skill set to contribute to these projects, we run a practical robotics education and training program at the beginning of each school year. Students form small groups and tackle simple robotics challenges over the course of a month. We also deliver several weekly technical seminars covering topics from circuit design to 3D modeling to digital image processing that are open to all members of the CWRU community and local high schools.

Since our projects are multidisciplinary team efforts, members learn effective collaboration techniques, practice structured and thorough design processes, and take on leadership roles within the club. From Mechanical Lead to club President, students can gain a wide variety of technical and leadership experiences.

CWRUbotix is dedicated to positively impacting the Cleveland community. We partner with local middle and high schools to introduce students to robotics and engineering, run merit badge workshops with the Girl Scouts of America, and volunteer at several STEM related events for K-12 students in the area.



Sincerely,

Julianna Carreras

Julianna Carreras
President
julianna.carreras@case.edu



We are CWRUbotix, Case Western Reserve University's premier robotics club.

We build robots for a variety of competitions and engage with the local STEM community.

MATE ROV

MATE ROV is CWRUbotix's main competitive

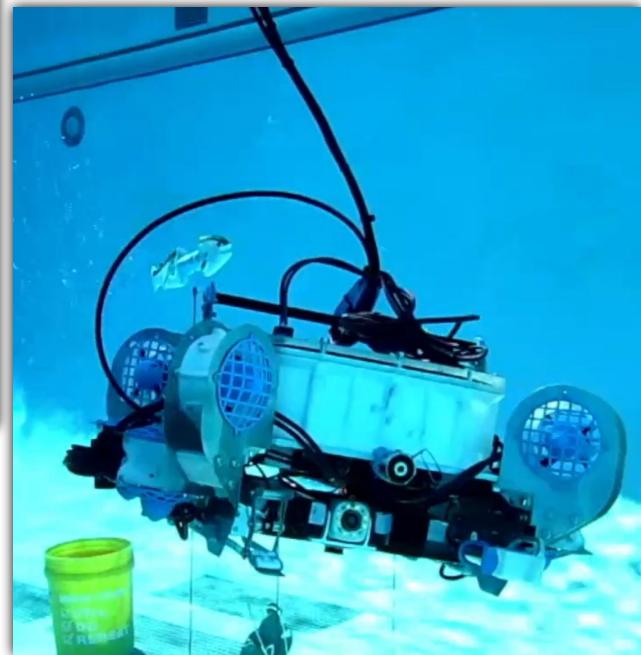
robotics team. As part of the competition, teams from around the world build a robotic submarine, referred to as an ROV (Remotely Operated Vehicle), capable of performing a number of complex underwater tasks which are intended to simulate the missions that a full-size professional ROV would undertake in a marine environment. These tasks change with each competition season, but are all based upon problems which currently threaten the health of our oceans and waterways, such as pollution and coral bleaching.

Building upon the lessons we have learned from past iterations, our team designs and fabricates a completely new robot each year. We take the challenge of constructing the best possible robot very seriously; each year, we push ourselves to optimize the robot's capabilities and design features.



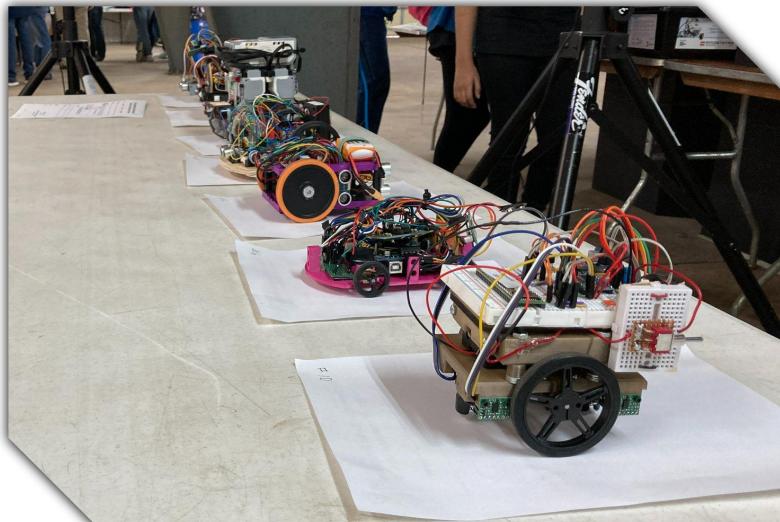
We call upon the brilliant, young minds of our 15–25 active members to design and build custom hardware, software, and mechanical solutions which will work in concert with each other to tackle these complicated challenges.

During our inaugural campaign in the 2018–2019 season, we placed 6th overall at MATE's International competition while also taking home the Engineering Elegance Award for best systems design. Thanks to the dedication of our member and generosity of our sponsors, the 2021–2022 team placed 2nd in Product Demonstration and Technical Documentation categories and placed 5th overall out of 20 teams from across the globe. Following this year's success, CWRUbotix is excited to innovate and return to compete in 2023.



National Robotics Challenge

The National Robotics Challenge is a robotics event which offers a range of robotics competitions, covering topics from combat robots to autonomous vehicles. For the past several years, CWRUbotix has participated in many of the available competitions, the most recent of which are showcased here.



Micromouse

Micromouse is a maze robot is tasked with solving a complex maze as fast as possible. This year was the first time CWRUbotix competed in the competition. Our robot uses an ARM microcontroller running an RTOS with several sensors to map and negotiate the maze. Members of the micromouse team will learn circuits, PCB design, embedded programming, mechanical CAD, and 3D printing.

Combat Robot

Two robots enter, one robot leaves. Saws, rammers, grabbers, flippers, and weapons of all varieties are allowed. CWRUbotix participates in the beetleweight or 3 lb combat competition.

The 2021–2022 combat robot was a full body spinner that consisted of a flexible 3D printed chaise with a three omni wheel drivetrain. Our weapon was a beyblade inspired aluminum ring around the robot that was attached to the frame with a polycarbonate wheel on the top. This year's team placed within the top 8 teams within the NRC combat post-secondary division.



Outreach

The largest goal of our outreach projects is to share our passion for robotics and STEM with the greater Cleveland community by making our team both a technical resource and source of inspiration for students of all ages. As a diverse team, we seek to broaden the reach of STEM education, particularly for those who have limited access to the ideas and fields we seek to represent. By increasing awareness in our campus community and acting in the greater community around us, we have made an impact on lives through robotics

K-12 outreach and community involvement is a big part of CWRUbotix



Contribute

Direct contributions enable CWRUbotix to purchase the components, materials, software, equipment, and resources that allow us to accomplish the core of our mission: building great robots. Direct contributions also allow the team to fund and expand its outreach efforts and bring the team to competitions that require overnight travel.

Donations of material, software, tools, workbenches, and more have made it possible for CWRUbotix to expand the complexity and performance of its designs, better develop and understand its projects, and work more productively.

Donating services such as machine-time, welding, facility-usage, and more allow us to expand our capabilities while helping to educate the next generation of creators, engineers, and leaders.

Outreach as a whole is facilitated by the CWRUbotix executive board, with individual events led by volunteer team members and run by the team as a whole. In particular, many of our members who participated in organizations such as FIRST, Science Olympiad, and Girl Scouts take the lead in our outreach efforts.

In addition, we seek to:

1. Educate the campus community on robotics activities within the university
2. Unite the different departments within the Case School of Engineering such as Electrical, Computer, Computer Science/Software, Mechanical, and Aerospace Engineering
3. Promote STEM education and awareness in the Greater Cleveland community
4. Foster an environment of outreach and volunteering within the team itself



Thank you for your contribution!



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Dear Potential Sponsor,

CWRUbotix's mission is to create robots that solve challenging and important problems. We expose students to technical concepts beyond the scope of their curricula, offer experiences in leadership and collaboration, and promote STEM through educational programs in the Cleveland community.

CWRUbotix seeks to build mutually beneficial relationships with industry sponsors, leveraging their invaluable support to train and widen the perspectives of the next generation of engineers and promote STEM to a wider community. Sponsorship has enabled CWRUbotix to bring hands-on experience to more students, enriching their college education and better preparing them for entering industry.

Thank you for taking the time to consider sponsoring CWRUbotix. If you have any questions or would like to sponsor us, please visit our website <http://www.cwrubotix.org/> or email us at robotics-exec@case.edu.

Sincerely,

Aranya Kumar
President
aranya.kumar@case.edu



MATE ROV

MATE ROV is CWRUbotix's latest endeavour into competitive robotics. As part of the MATE ROV competition, teams from around the world build a robotic submarine, referred to as an ROV (Remotely Operated Vehicle), capable of performing a number of complex underwater tasks which are intended to simulate the missions that a full-size professional ROV would undertake in a marine environment. These tasks change with each competition season, but are all based upon problems which currently threaten the health of our oceans and waterways, such as pollution and coral bleaching.

We call upon the brilliant, young minds of our 15-25 active members to design and build custom hardware, software, and mechanical solutions which will work in concert with each other to tackle these complicated challenges. Great success was found during our inaugural campaign in the 2018-2019 season, placing 6th overall at MATE's International competition, while also taking home the Engineering Elegance Award for best systems design.

Due to the Coronavirus pandemic, our 2020 and 2021 seasons were cut short because of college-wide safety restrictions in our workspace. However, we are committed to competing in the upcoming 2021-2022 season.

NRC

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Combat Robot

Two robots enter, one robot leaves. Saws, hammers, grabbers, flippers, and weapons of all varieties are allowed. This year's 3lb, drum spinner robot improved on previous years' designs to challenge the competition and is eager to continue CWRUbotix's golden winning streak.



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We like long walks on the beach (with robots), designing and building robots for a variety of competitions, and engaging with the local STEM community.

NASA RMC

The NASA Robotics Mining Competition is a national collegiate competition where teams design a Rover capable of autonomously excavating regolith in a simulated lunar environment. Teams can win awards for excavation, autonomy, regolith handling, communications, outreach, public engagement, and more. The hope is that NASA may use some of the designs from this competition to inspire future Lunar excavating rovers. The competition is held every year in May at the NASA Kennedy Space Center.

Each year, our team designs and fabricates a new robot from the ground up, building upon the lessons we have learned from past iterations. We take the challenge of constructing the best possible robot very seriously, pushing ourselves to optimize the robot's capabilities and design features. Beyond the robot performance in the mining area, the competition places a strong focus on project management. Our team utilizes systems engineering to ensure we meet important deadlines and remain on budget. This approach prepares our members for the challenges and responsibilities they will face in industry.



In 2019, we earned 3rd place overall in the mining category and 4th place in the autonomy category out of nearly 30 teams at the National Robotic Mining Competition, a leap forward from our 4th place overall finish in 2018. This was also the first competition where the team scored in the autonomy category. We also won 3rd place for our Systems Engineering paper at the competition.

For several years, we have been applying system engineering principles to our robot design process, and we really threw ourselves into doing it well. It has paid off in more ways than one, as 2019's robot had the most successful mining run in team history. In the span of one year we were able to mine and successfully deposit almost 20 times the amount of material we could in 2018.

During the 2021 season, the NASA RMC team worked to dramatically improve the autonomy and mining capabilities, all the while trying to make it fit inside a launch payload volume 70% smaller than in 2019 due to new competition requirements. The team scored 4th overall in the 2021 competition and is looking forward to the competing in the 2022 season.

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#1

#2

#3

#4