



# WPI

## **WPI-Hosted Robotics Competition IQP**

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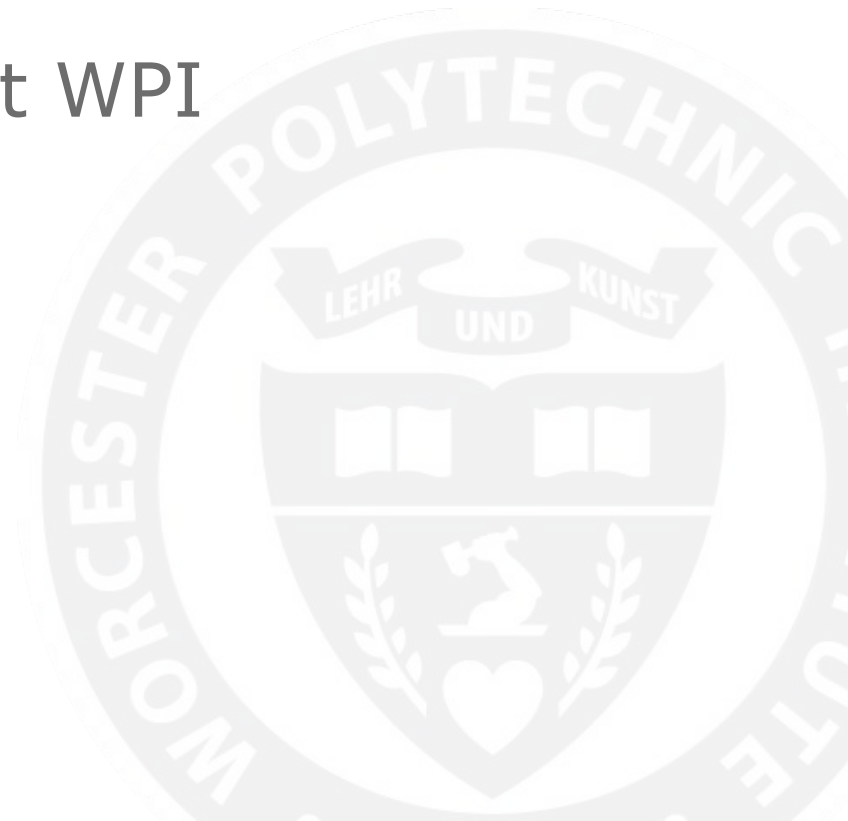
# Abstract

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- Goal:
  - To develop a collegiate robotics competition hosted by WPI.
- Background research:
  - Researched other competitions to identify what makes them successful.
- What we did:
  - Interviews
  - Develop a plan of action

# Background

Robotics competitions at WPI

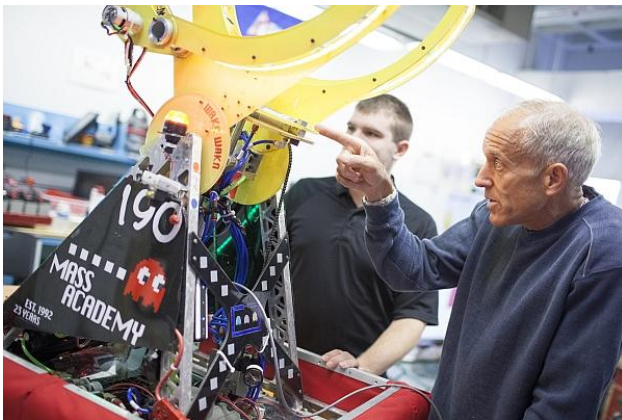


# Robotics Competitions at WPI: FIRST

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- Been part of WPI since 1991
- “One of the longest continuously involved universities” – Ken Stafford



# Robotics Competitions at WPI: NASA Centennial Challenge

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- Ran from 2012 to 2016
- WPI was the only university to host a NASA Centennial Challenge



**As a leader in robotics,  
WPI has never had a  
collegiate robotics  
competition...**

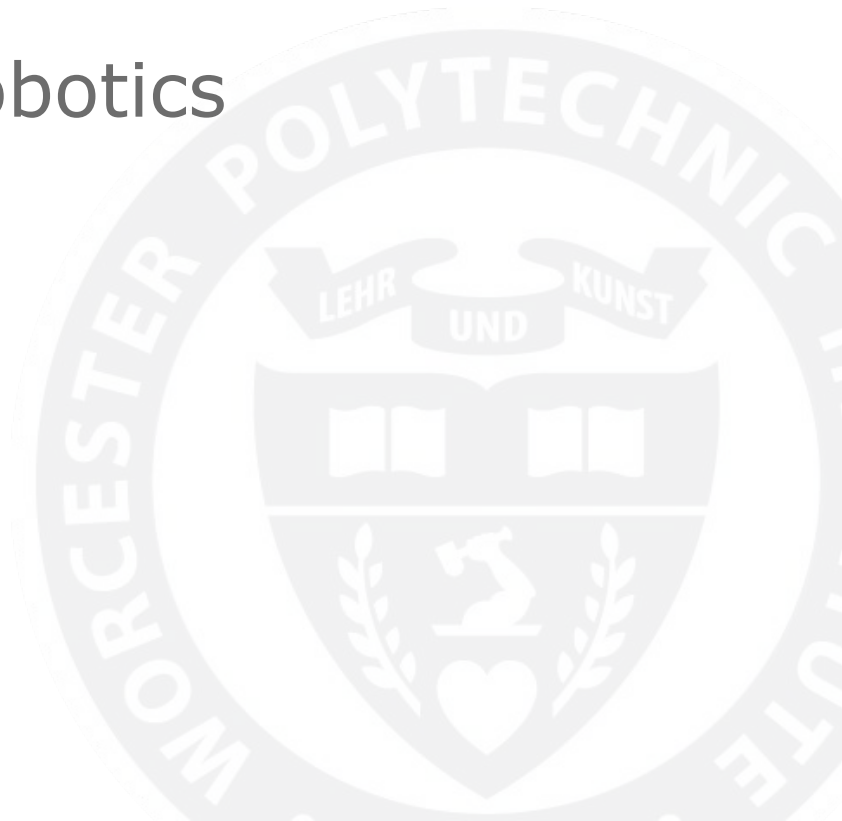


**...It's time for WPI to  
host a collegiate  
robotics competition.**



# Why?

Why host a collegiate robotics competition?





# Benefits

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**UBER** ATG

**iRobot**<sup>®</sup>

**mass**robotics

- An opportunity to form relationships with companies in the robotics industry

# Benefits

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- An opportunity to bring other institutions to WPI
- A way to publicize the robotics program on an international level

# Competition Development



# Determining Value

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- Interviewed:
  - **20** representatives from **18** universities
  - **5** potential sponsors
  - Key stakeholders at WPI



# What We Discovered

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- Ideal Dates
  - End of May, Beginning of June
- Interests from potential participants
  - Projects with real-world applications
- Corporate interests
  - Development of relevant skills
- WPI stakeholder interests and requirements
  - Admissions
  - Peer to peer recognition

# Developing the Event

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- Proposed Challenges
  - All-Terrain Challenge
  - Underwater Aquaculture Challenge
  - Mini Fire-fighting Challenge
  - Item Sorting Challenge
  - Autonomous Vehicle Race
  - Mini Warehouse Swarm Robotics Challenge
  - Indoor Drone Competition

# Challenges

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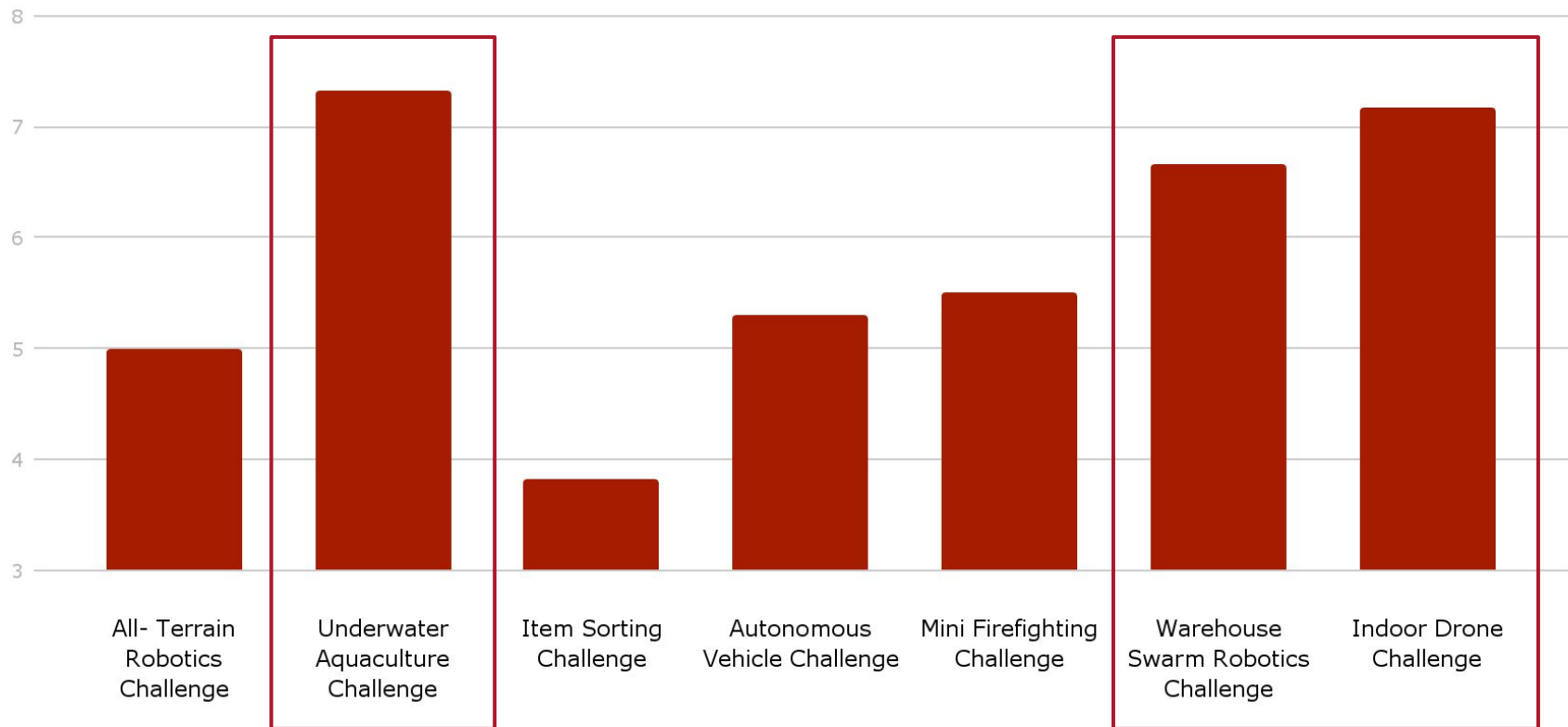


- Each challenge is based on finding solutions to real-world problems.



# Competition Feedback

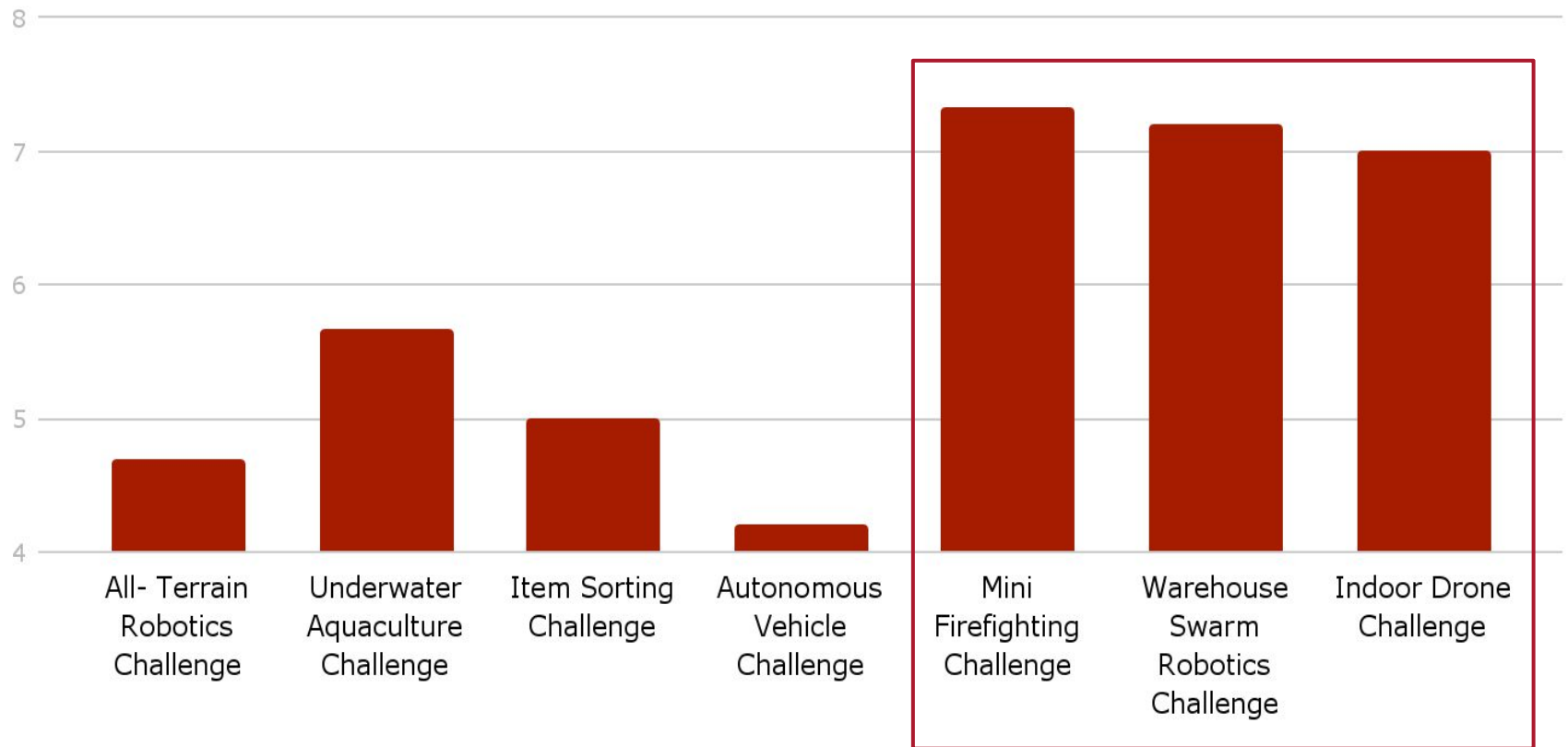
## Interest in Challenges





# Competition Feedback

Likelihood University will Participate



# Competition Comparison

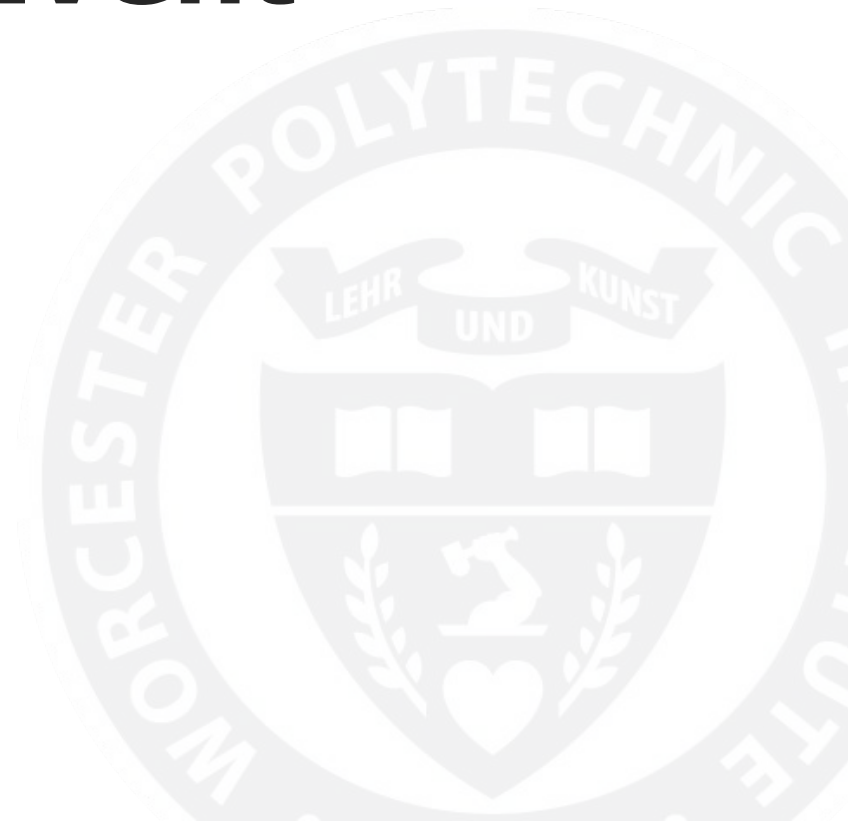
Metric	All- Terrain Robotics Challenge	Underwater Aquaculture Challenge	Item Sorting Challenge	Autonomous Vehicle Challenge	Mini Firefighting Challenge	Warehouse Swarm Robotics Challenge	Indoor Drone Challenge
Estimated cost range of this competition for teams	\$4,000 -\$12,000	\$7,000 -\$12,000	\$1,000- \$5,000	\$3,000- \$10,000	\$100- \$1,000	\$1,000- \$7,500	\$500- \$5,000
Estimated number of students on participating teams	4-10	4-10	4-6	4-10	4-6	4-8	4-6
Type of space necessary to host	200x100 ft Indoor Space Minimum, 100x100 ft Outdoor space minimum	Swimming Pool	Up to 100x100 ft Indoor Space	200x200 ft Outdoor Space Minimum	Up to 100x100 ft Indoor Space	Up to 100x100 ft Indoor Space	Up to 100x100 ft Indoor Space

# Developing the Event

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- Proposed Challenges
  - All-Terrain Challenge
  - Underwater Aquaculture Challenge
  - **Mini Fire-fighting Challenge**
  - Item Sorting Challenge
  - Autonomous Vehicle Race
  - **Mini Warehouse Swarm Robotics Challenge**
  - **Indoor Drone Competition**

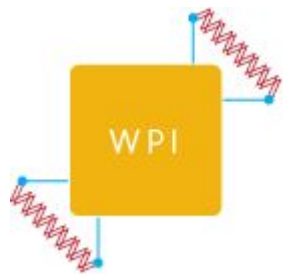
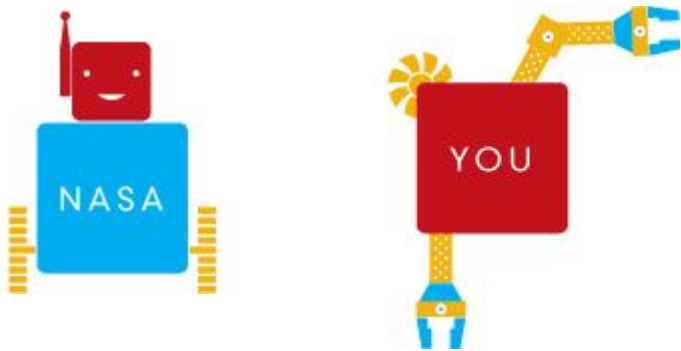
# Our Proposed Event



# Hosted in Collaboration with TouchTomorrow

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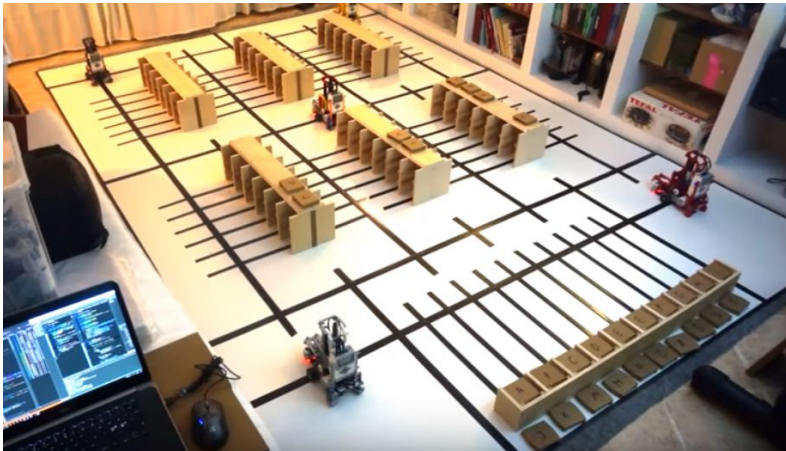
TOUCHTOMORROW  
JUNE 9



- Fun and exciting audience-friendly event
- Early June is the ideal time for a collegiate robotics competition
- Friday and Saturday

# Warehouse Swarm Challenge

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- Related to warehouse robotics, such as the Amazon warehouse robots
- Develops swarm robotics and systems skills

# Indoor Drone Challenge

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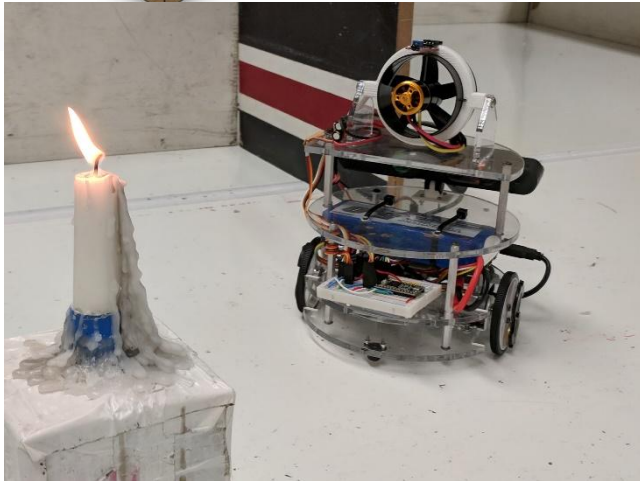
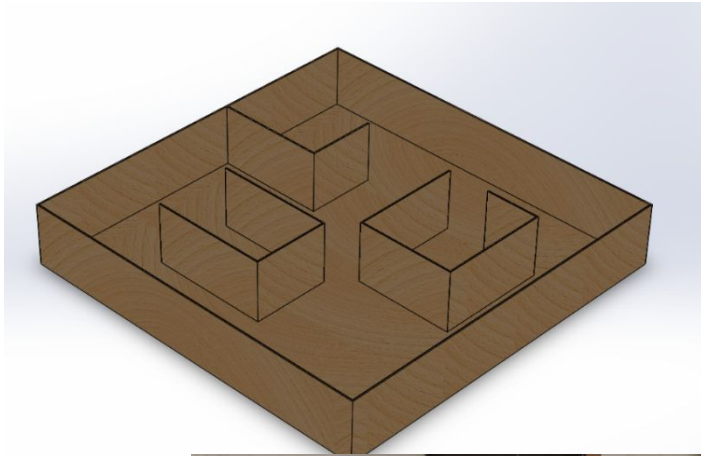


- Related to transporting goods and people
- Develops advanced computer vision and navigation and control skills



# Mini Fire Fighting Challenge

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- Related to search and rescue
- Develops navigation and basic robotics concepts
- Based on Trinity Fire Fighting Contest



# Making this a Reality



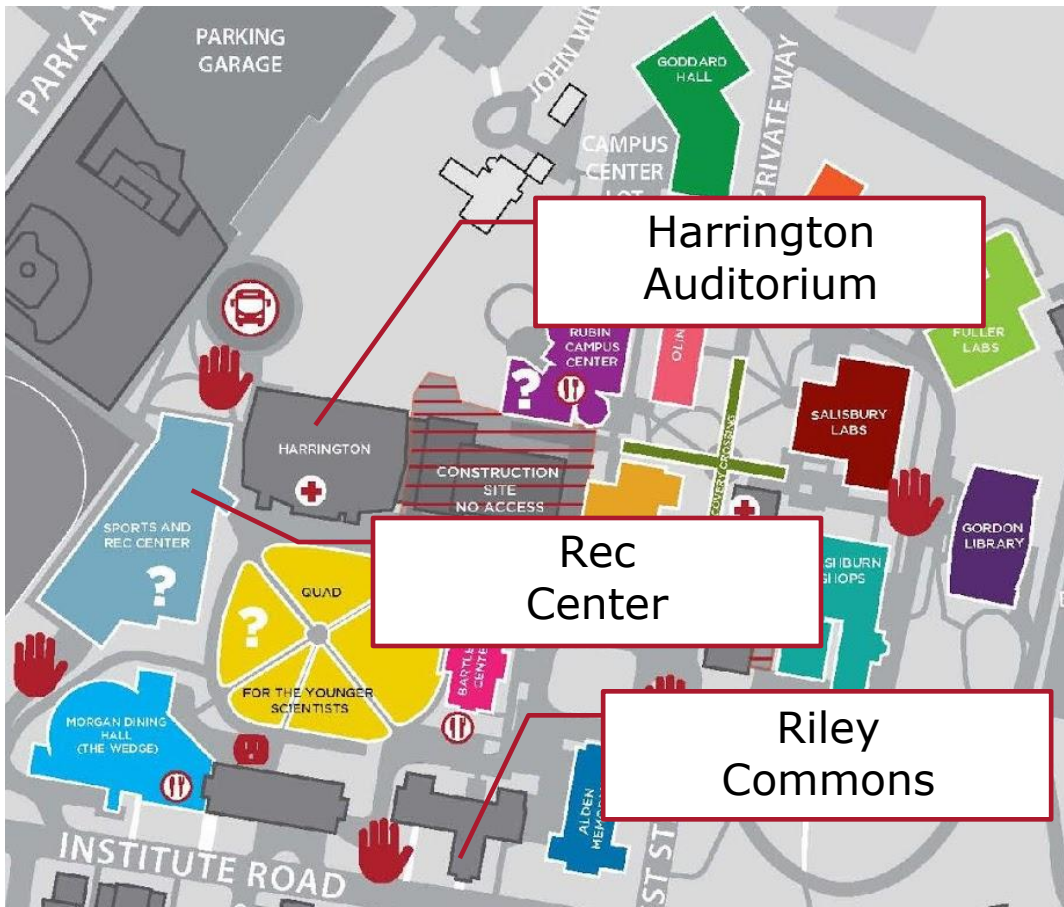
# Sponsors

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- Through corporate sponsorship, the event would be cost-neutral
- Companies would sponsor competitions
- Job fair and booths
- Networking opportunities

# TouchTomorrow Locations



- Harrington
  - Drone & Warehouse Sorting Challenges
- Riley Commons
  - Mini Fire Fighting Challenge
- Rec Center
  - Robot Pits
    - Team pits
  - Basketball Courts
    - Sponsor booths/career fair

# Future Work

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- Implementation
  - Formation of a committee
- Earliest could host would be during TouchTomorrow 2019
- Rules released in June 2018



