

Robotics Innovation Competition & Conference 2010-11

Rules and Guidelines

(Revised 8-Sep-10)

The Robotics Innovation Competition & Conference (RICC) is focused on undergraduate and graduate students engineering new technologies and methods for the real world. Focused on innovation, technical approach, demonstrability, and professionalism, RICC is seeking new project work to advance the state-of-the-art relative to the year's theme.

Objective

The theme of the competition is to develop an innovative and creative solution that uses **Robot Mobility through Unconventional Means**.

General Rules

Team Rules

- Each team must consist of a minimum of 3 members. Team members must be enrolled students at either the graduate or undergraduate level at the time of registration. Full-time and part-time students are eligible to compete.
- Teams must have at least one advisor, but may have an unlimited number of additional advisors.
- Teams must apply during the application window (listed below). Teams will be notified if their application is accepted or declined within 10 days of receiving the application via a letter sent by the competition administrator.
- All teams must submit a detailed description of project entry by the due date below following the form posted on the competition website.
- Teams will be designated to compete in the Undergraduate or Graduate Team Division based on the student status of team members. Teams with that least one full-time or part-time graduate student will be considered a Graduate Team.

Robot Rules

- A robot is defined as an electro-mechanical-computing system that senses and interacts with its environment.
- The robot or technologies and methods of the robot must exhibit mobility through unconventional means.
- The innovation presented must have been developed in the past 12 months or significant, measurable improvements made by the team in the past 12 months. Judges may make exception for work outside that scope that has never been previously published or presented.
- Teams must have a functional prototype robot to demonstrate at the competition.
- It is recommended that the robot fit in a 1 m wide x 1 m deep x 2 m tall envelope given the presentation venue. Those who anticipate their robot will exceed this envelope must contact the competition administrator for approval.
- Since any robots utilizing flammable or combustible fuels will be accommodated outdoors, contact the competition administrator for approval if you intend to use such them in your prototype.

Safety Rules

- All robots must be designed to avoid injury or posing a hazard to people or the demonstration environment.
- All pinch hazards, chains, belts, gears, and rotating shafts must be fully shielded or otherwise designed to avoid injury from accidental contact.
- All systems must be designed to avoid shock hazard. No electrical contacts may be exposed, except for sensors requiring exposure. If sensors are to be used in contact with the human body, they must satisfy all applicable regulations.
- Every electrical circuit must have appropriate over current protection
- Any electrical component must be used within the manufacturers operating rating.
- Any hazardous, corrosive, or flammable liquids, solids, or gases must have auxiliary containment to prevent chemical spills
- Any energy storage device must be shielded or contained in such a way that a failure of any component of the robot will not pose a danger.
- Shielding or other design methods must be in place to mitigate ejection hazards.
- In the event of a failure, the robot must be fail-safe.

Awards

- Cash prizes up to \$5,000.
- Trophies for first place and individual categories in both the Undergraduate and Graduate Team divisions.
- An opportunity to present at the TEPR Conference for the overall top submission from all divisions, as decided by the judges.

Competition Dates of Interest

Competition Guidelines Posted	September 8, 2010
Application Due	November 8, 2010 – March 4, 2011
Detailed Description of Project Entry Due	March 4, 2011
Participation Confirmation	March 11, 2011
Written Report Due	March 25, 2011
Competition	April 10, 2011

Other Notes:

- Limited resources (\$1000) for purchase of parts and supplies relating to the construction of the functional prototype will be available following acceptance into the competition for the 1st ten (10) accepted teams. The team must provide an itemized preliminary list of materials and costs, and specify name and mailing address to be used for the check. By accepting this check the team agrees to send at least one team member to the event with their functional prototype to compete.
- Up to an additional \$500 travel grant will be awarded to the 1st ten (10) accepted teams upon our receiving submitted original expense receipts.

Competition Administrator:

Colleen Shaver
Worcester Polytechnic Institute
Higgins Lab – ME Dept
100 Institute Rd.
Worcester, MA 01609

E-mail: colleen@wpi.edu
Phone: (508) 831-6750

Judging Guidelines

All teams' technologies or methods will be judged using a predetermined rubric by a set of qualified judges based on information submitted in advance and presented at the event. This rubric will be made available to teams prior to the event; however the general guidelines for judging are outlined below.

Assessment

Teams will be judged in the categories of innovation, actualization, technical approach, and professionalism using the deliverables listed below.

In all cases, while the robot itself may be part of a longer term project, **judges seek only to evaluate those contributions made by RICC team members and done so in the previous 12 months.** All deliverables should clearly communicate and focus on those contributions.

Deliverables

Each team must provide the following elements to be considered for awards:

- Written report (submitted prior to the event)
- Poster
- Oral presentation with live prototype demonstration

Written Report

The written report should be written like a project proposal for someone who might seek to use your robot. The report must be submitted to the competition administrator via e-mail in Adobe PDF format by the due date. The contents should include:

1. Title page
2. Executive Summary (<250 words) providing a synopsis of key points.
3. Market Analysis for your concept (<750 words) including: 1) a description of prospective customers, market size, and growth prospects, 2) a cost estimate for the final product, 3) a description of primary competitors, and 4) a comparative analysis of your product against its top competitor.
4. Robot Overview (<750 words) including: 1) what your robot, technology, or method is meant to accomplish, 2) how it meets the challenge theme, 3) performance specifications is intended to meet, and 4) a description of design methodology.
5. System Design Analysis (<750 words) explaining the design of your robot with emphasis on ensuring the integration of the electrical, mechanical, and computing systems to meet your performance specifications.
6. Innovation Design Analysis (<750 words) describing the details, including an engineering analysis, of the primary innovation(s) of your robot, technology, or method. Describe the value added by your innovation(s).
7. Results of Analysis (<750 words) describing how you verified that your design meets the performance specifications. This may include tests, measurements, statistical analysis or other means.
8. Summary (<250 words) presenting conclusions and provide recommendations for future work.

Poster

To promote interaction and in-depth discussions, every team will create a poster describing their robot and the development process. Posters must fit on a corkboard easel with dimensions of 3 feet x 4 feet. A large-format poster or a composite display is acceptable. Push pins will be provided.

Presentation and Demonstration

The presentation and demonstration is an opportunity to describe your innovation to the judges and conference attendees as well as showcase the actual prototype in a live display. Provided on-site will be a Windows laptop, projector, screen, microphone, and standard 110V 60 Hz A/C power. Your team is required to provide any items necessary to properly display your prototype and any and all display materials must be able to be setup and taken down quickly.

While video of your innovation in action is welcome as part of your presentation, **it is not allowed as a replacement for the live demonstration.**

The length of time for setup and your presentation depends on the final number of competing teams. The competition administrator will provide these times to all competitors no later than 28-March-2011.

Judging Criteria of Project Deliverables:

- Innovation – 35%
 - This category may include impact, creativity, and novelty.
- Actualization – 30%
 - This category allows judges to evaluate the quality of the demonstration and how well the prototype achieves expected outcomes.
- Technical Approach – 20%
 - This category may include design, analysis, and safety considerations.
- Professionalism – 15%
 - This category may include teamwork and quality of presentation.