How will competitions change engineering education?

Nancy Clark Brown
Engineering Deans Institute, 17 April 2012
Competitions in Engineering Education

How competitions are leveraged in Engineering Education today:

- Special topics courses adjacent to core curriculum
- Collaboration or partnership courses
- Publicity, engineering reputation and recognition
- Student motivation and engagement
- Recruitment

Iowa State University, Team Prisum Car
The Value of Competitions in Engineering Education

- Often simulates real world experience, processes or methods
- Develops 21st century skills
- Collaborative, multidisciplinary
- Exposes students to business, entrepreneurial methods


Photo Credit: Jim Tetro, U.S. Department of Energy Solar Decathlon
How will competitions shape engineering education in the future?
Robotics Competition Teams

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Teams</th>
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<tbody>
<tr>
<td>2005</td>
<td>2069</td>
</tr>
<tr>
<td>2006</td>
<td>2696</td>
</tr>
<tr>
<td>2007</td>
<td>3194</td>
</tr>
<tr>
<td>2008</td>
<td>4920</td>
</tr>
<tr>
<td>2009</td>
<td>6435</td>
</tr>
<tr>
<td>2010</td>
<td>8469</td>
</tr>
<tr>
<td>2011</td>
<td>10,600*</td>
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Shell Eco Marathon 2012

45% of the 124 cars from the United States are high school teams
Example: Team Antipodes

Above: Portion of the spreadsheet tool to help FTC teams budget and order. LEGO Education pricing as of March 2012. Physical tools are not included in budgeting because they tend to be owned by organizations outside of the team.
Example: Team Antipodes

- Magnetic Levitation Research – 6 iterations to produce a 3 phase, 6 solenoid
Example: Team Antipodes
Example: Team Antipodes
Example: Intel Science Talent Search

Grand Prize: USD 100,000 Scholarship from the Intel Foundation
Nithin Tumma, 17, of Fort Gratiot, Michigan, analyzed the molecular mechanisms in cancer cells and found that by inhibiting certain proteins, medical personnel may be able to slow the growth of cancer cells and decrease their malignancy. This could lead to more direct, targeted, effective and less toxic breast cancer treatments.

Learn more about Nithin’s research

Second Prize: USD 75,000 Scholarship from the Intel Foundation
Andrey Sushko, 17, of Richland, Washington, designed and built a tiny motor, only 7 millimeters in diameter, which uses the surface tension of water to turn its shaft. Andrey’s long-time interest in model boats led him to discover this novel approach, which could have applications in micro-robotics.

Learn more about Andrey’s research

Third Prize: USD 50,000 Scholarship from the Intel Foundation
Mimi Yen, 17, of Brooklyn, New York, isolated and mapped the gene responsible for mutant behavior in C. elegans, a worm often used as a model in scientific research. Her work may help us better understand the genes that contribute to behavioral variations in humans.

Learn more about Mimi’s research
Engineering Competitions; Implications for the Future

- When engineering competitions are mainstream, how will it effect undergraduate education?

- How will engineering education accommodate students that have grew up with project based, hands-on learning environments?

- When Science and Math high school students become “rock stars” how will universities compete for the best students, if industry is also competing for the same students?
Can the “competition” be the research agenda?

- More integration with department research agenda
- Alignment with faculty expertise
- Particular track in the engineering program focused on innovation, entrepreneurialism
- Directed research agenda in the context of competition environment